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THE TEACHING OF PHARMACOLOGY*

ARTHUR D. HIRSCHFELDER, M.D.

MINNEAPOLIS

Our last chairman made a plea to bring the practice of clinical medicine closer to pharmacology. I should like to make a plea to bring the teaching of pharmacology closer to clinical medicine.

In saying this I have no desire to return one inch toward the old style teaching of empiricism, or to lessen one iota in the teaching of the physiologic action of drugs. I have selected this subject, trite as it is, on account of the difficulties which I myself encountered as a medical student in the study of pharmacology, and which I meet again in my own students and in the students of other medical teachers. I believe that these difficulties are not entirely inherent in the nature of the subject. Medical students have difficulty in grasping, assimilating and remembering the facts of pharmacology because they have too few pegs on which to hang them; and the value of the subject and its usefulness to them in after life suffers accordingly. I believe that this trouble is not inherent in the nature of the subject, and that it lies with us as teachers to remedy the defects.

I believe that we can do this partly by teaching the student how to study accurately the effects of drugs on himself, partly by basing our animal experiments and our didactic teaching largely on pathologic physiology, and by assigning to our student, at the time he is studying the formal pharmacology, enough outside reading of clinical pharmacology to make him see for himself the usefulness of the subject.

USE OF MAN IN EXPERIMENTAL WORK

I should like to begin by pleading for a more important place for man among the laboratory animals in routine teaching. He is just as good an animal as a dog or a rabbit. In the present state of affairs he is more plentiful, and he is cheaper; and to most medical students, especially when one experiments on himself or his fellow students, a great deal more impressive and a great deal more interesting. Just in proportion to this interest and to the associations in which it is clothed, the lessons learned in such experiments are the more impressive and the more lasting. Moreover, since we are training medical students to observe and treat patients, the experiments that they perform with accurate methods on themselves and on their fellows are also furnishing them with training and habits of applying equally accurate methods later in the treatment of their patients.

One of the most important lessons that they learn in this connection is the science of dosage. They take the drug in conventional dosage, and in most cases they get no effect. So they should be made to repeat the experiment, increasing the dose until an unmistakable physiologic effect is obtained. To avoid the effects of suggestion, different types of drugs having opposite or nearly opposite actions, interspersed with some inactive ones, should be given to each group of students, and they should not be told what drug they have been working with until the true results have been obtained and checked off by the instructor.

Occasionally a student is encountered who has a mild idiosyncrasy; his exaggerated reactions to an ordinary dose quickly become the talk of the class, and the effects of this drug are fixed in their minds forever.

Of course, the drugs that may be used for such purposes are limited in number. However, in such experiments as the testing of local anesthetics, the effects of boiling on cocain, the repetition of some of the studies of Hewlett, of Edsall, and of G. N. Stewart on circulatory and respiratory stimulants and nitrites, of Hollingsworth on the effects of caffein on cerebration and coordination, coupled with similar experiments on the opiates, bromids, epinephrin and strychnin, as well as in the studies of E. G. Martin on acetphenetidin, and in those of Macht on the morphin derivatives, we have a sufficiently large and varied series to impart a good deal of interest.

Such experiments bring the physiologic testing of therapeutic effects closer home to the student, and furnish him with the associations that render the impressions lasting. But we need not confine our experiments on man to such tests.

Experiments of theoretical importance, such as the conversion of organic acids to carbonates within the body and their use in the alkalinization of the urine, or the combination of drugs with hippuric and glycuronic acid, are more easily shown to the student in experiments on himself than in any experimentation on the lower animals.

PATHOLOGIC PHYSIOLOGY AND PHARMACOLOGY

In our experimentation on animals, too, we can do much to bring the picture home more closely to the clinical medicine for which he is aiming, not to the detriment, but even to the betterment of our pharmacologic lesson. We can begin the experiment by having the student reproduce in a measure some of the pathologic physiology of the disease to which the drug is applied.

* Chairman's address, read before the Section on Pharmacology and Therapeutics at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

For example, much of the pathologic physiology of pylorospasm and many of the motor disturbances in vagotonia can be simulated by mechanical stimulation of the corresponding parts of the gastro-intestinal tract or by administration of pilocarpin. The changes can be watched through a window inserted in the abdominal wall, and the relief of the dynamic condition by atropin and papaverin can be readily seen. So, too, the intestinal spasm accompanying lead colic can be simulated by intravenous injection of lead acetate, and the relief afforded by atropin and nitrites can be demonstrated.

Similarly, in the therapeutics of the circulation, modes of action which render digitalis useful in therapy can be much more easily demonstrated from the starting point of pathologic physiology than from the normal. Thus, by continuous faradization of the auricles, we can reproduce exactly the clinical picture of auricular fibrillation with the accompanying absolute arrhythmia; and here, as in the clinical case, we can get more striking slowing of the heart than we get in the normal animal. Again, since digitalis acts best on the dilated heart, we can demonstrate its effect on the strength and tone of the heart muscle more strikingly on a heart that has been previously made to dilate by a properly graded clamping of the thoracic aorta. Still further, we can show the truth of Mackenzie's statement that digitalis fails to work on the poisoned heart muscle by demonstrating side by side the production of systolic death in the normal digitalized frog's heart and the death in diastole that occurs in a chloralized frog that his been similarly treated.

Occasionally an obstetric clinic can be held on the exposed uterus of pregnant animals to demonstrate the effects of pituitary solution and of ergot on uterine contractions, as well as the arrest of the latter by atropin.

VALUE OF SIMPLICITY

Let me insert, here, too, a plea for another departure from the usual procedures of the physiologic laboratory; a plea for greater simplicity in the technic of experiments that are used for laboratory teaching. Having been one of the earliest workers to apply the cardiometer to the study of pharmacologic problems, I confess that it was with a pang of regret that I asked myself whether my students would not learn more by watching with their own eyes the changes in volume that occur in the exposed heart under the action of drugs than they would by stowing the ventricles away in a cardiometer, and only finally learning the same things by translating the cardiometric curve back into terms of volume change. We are training them to be clinical observers, and most of their clinical work will be done by simple observations, so we should, whenever possible, train them to observe accurately changes in the organs that lie exposed beneath their eyes.

Moreover, it is not always true that recording by instrumental means is necessarily freer from error than is the ocular observation. Years before Starling and Markwalder demonstrated, by means of a stromuhr placed in the coronary sinus, that nitrites increase the flow through the coronary vessels, François Franck had shown that the caliber of the coronary arteries increases when these drugs have been administered. This is all the more evident if one directs one's observation not merely to the large arterial trunks, but particularly to the very ends of the smallest visible arteries, just where they narrow into invisibility to the naked eye. After amyl nitrite and nitroglycerin, invisible branches widen into visibility, so that new stretches of artery come into view and seem to shoot out their branches into areas in which none could be seen before. When such a change in phenomenon is accompanied by a fall in general blood pressure, as is often the case, it could be due only to a true dilatation of the arteries; and this demonstration, since confirmed by the elaborate method of Starling, is much simpler, easier, and more striking by the method of ordinary ocular observation.

In our didactic teaching, too, we can add much to the interest of the presentation by laying as much emphasis as possible on pathologic physiology and by teaching the students to look for physiologic targets at which to aim their therapy.

Thus, there is a radical difference between the empiric statement that belladonna is put into a purgative pill to relieve cramps, and teaching the student to realize that cramps are associated with intestinal spasm, usually due to overstimulation of the parasympathetic system; and that atropin relieves the symptom by relaxing the muscle through its inhibitory action on the parasympathetic nerve endings. Almost every drug can be studied in that way—its modes of physiologic action being associated with the pathologic physiology of the conditions that the student is expecting to meet and anxious to treat.

I should not like to convey the impression that the fundamental relations of chemistry to pharmacology, of structure to physiologic action, should be neglected, since this is perhaps the most interesting of all the phases of pharmacology; but here again we can teach more effectively by simplification wherever possible, focusing the attention on the individual reaching groups of the molecule rather than on the whole complicated structure, and by associating them as closely as possible with physiologic effects and with clinical results. Thus a knowledge of the danger that results from oxidation of the arsenic portion of the arsphenamin molecule on standing imparts an immediate interest to the structural formula of arsphenamin. A knowledge of the ease of hydrolysis of acetyl esters helps the student to understand why heroin is more of a habit-forming drug than codein, etc. Chemistry should be made simple and interesting by focusing his mind not on whole formulas but on the individual groups in which changes are accompanied by change of action.

ACQUAINTANCE WITH ORIGINAL LITERATURE

Most of all, perhaps, we can help the student by bringing him into first hand contact with original literature in which clear-cut pharmacologic studies have been made under clinical conditions. A first hand acquaintance with a couple of good articles on each group of drugs is both concrete and stimulating and, above all, the reading of the original literature is habit forming. I myself give my students, at the beginning of their course, a bibliography of about seventy articles of such type as Lauder Brunton's description of amyl nitrite in angina pectoris, James Mackenzie on digitalis, Sellards on alkalis in acidosis, and Leonard Rogers on emetin. They are required, in addition to their textbook reading, to make abstracts of these articles in good bibliographic form, and they are induced to start a card index of their own. They are compelled to get the work at first hand and to find for themselves the pegs on which to hang their knowl-

edge, and I think the results are as good as can be expected for their state of advancement in the medical curriculum.

And yet, in spite of all such efforts, pharmacology still remains a difficult subject for the student, and senior students and graduates still repeat: "We wish that we could have our pharmacology now. We could grasp the subject better." Though this lament applies to all the subjects in the curriculum, I believe it applies in a far higher degree to pharmacology than to any other subject.

PLACE OF PHARMACOLOGY IN THE CURRICULUM

For my own part, I believe that this very universal sentiment is worthy of careful consideration. I believe that we ought to ask ourselves seriously whether, in framing our curriculums, we may not have considered didactic convenience, the fact that in many schools pharmacology has been grouped under the department of physiology, and similar considerations, rather than the actual associations of the subject itself.

It might be worth while to push pharmacology farther along in the curriculum, and begin it in the junior, rather than in the sophomore year, so that the student would be provided with clinical pictures from his own experience with which to associate the drugs about which he is learning. He would then have the pegs on which to hang his facts. He would by this time have satisfied some of his very laudable appetite for diagnosis and symptomatology, and would have reached the stage at which he is desirous of knowing what to do for the patient. In other words, he would be prepared for the subject. Very little time really would be lost by this arrangement, since clinical teachers devote so little time and attention to the therapeutic side of the subject; and, on the other hand, I think a very distinct advantage would be gained by keeping some purely laboratory subject in the so-called clinical years and keeping the student with one foot in the laboratory while the other is in the hospital, to keep the two points of view constantly before him until he can unite them into a single image with full perspective.

CONCLUSIONS

These are a few of the methods by which pharmacology can be brought closer to the newer sciences of clinical physiology and clinical pharmacology in order that our students may weld their knowledge more firmly into the theory and practice of medicine.

ABSTRACT OF DISCUSSION

DR. TORALD SOLLMANN, Cleveland: Dr. Hirschfelder is fortunate in being able to work out the application of pharmacology to clinical problems of students and their friends as experimental "animals," and deserves encouragement. The student, particularly when the experimental work is given in the preclinical years, is much more impressed by experiments done on human subjects, than by what he does on animals. It has a little spice of novelty, at least, and it brings the matter of dosage, as Dr. Hirschfelder says, much more strikingly before him.

Many pharmacologic phenomena can only be illustrated by toxic doses, and minimum effects are not sufficiently constant or sufficiently pronounced, for a complete study of the subject. However, every point that can be illustrated on human material is one point that is better illustrated than it can be illustrated in any other way. Dr. Hirschfelder is right in emphasizing the fact that there is also a pathologic field for pharmacology.

I can further endorse the emphasis that Dr. Hirschfelder places on the return to direct observation, as supplementing instrumental observation. Neither alone really gives a complete picture, especially in the hands of students who are not yet trained observers. Often we learn more from a cardiac tracing—simply because there the thing is reduced to its simplest terms so that we can scarcely miss the essential phenomenon.

The collateral reading of original literature should be encouraged as much as the crowded condition of the curriculum permits.

The last point brought out, namely, the desirability of putting the subject of pharmacology a little farther along in the curriculum is one that I think all pharmacology teachers will endorse. Unfortunately, every medical teacher would like to teach his subject in the fourth year, and there is a sort of competition in that respect. In our institution we have found it very satisfactory to give half of the subject in the second, and half in the third year.

DR. FRED I. LACKENBACH, San Francisco: Dr. Hirschfelder has under his instruction some very raw material in the shape of naval students and hospital apprentices, and it would be very interesting, indeed, to know how these young men respond to his methods of teaching which, I am informed, are very practical. One of his students, one of our boys, who was with us about three years and who had acquired quite considerable knowledge along certain lines, was very enthusiastic over Dr. Hirschfelder's teachings and the breadth of the studies which these boys were undertaking. It would be very interesting to know how these lads respond. These are raw youths; in many instances, perhaps, having had no previous experience along these lines.

DR. S. J. MELTZER, New York: A pharmacologist should have a year or two of training in the practice of medicine before he starts teaching pharmacology, and not only in a hospital where the physician is practically not responsible to any one, but in private practice. The percentage of mortality is not the only thing which the physician has to know; he must know how to relieve. Then, the pharmacologist should free himself from the idea that his task consists in teaching the physiologic action of drugs on normal animals. He must know and teach the action of drugs on pathologic individuals. He must give up further the old notion that pathology is nothing else but physiology in different conditions. Antibodies, etc., are not physiologic products; they are peculiar to pathologic states. Numerous patients get well without any drugs; but it should be kept in mind that they get well not by accident but by definite treatment, the treatment consisting in the use of newly formed antibodies. That is nature's school of pharmacology, and the teacher of pharmacology will do well to take a thorough course in this school. Furthermore, the pharmacologist should keep in mind that one and the same drug may have a profound effect on a pathologic state and have no effect whatever in a physiologic condition. An antipyretic may reduce a temperature from 105 to 99 F., but will not be capable of reducing the temperature even by one degree when administered to a normal individual. You may give a large dose of alcohol to an infected patient without producing any signs of intoxication, while only a small fraction of that dose may cause intoxication of a healthy individual. Then the pharmacologist should cultivate in the student the point of view of a scientific physician; a drug which does no harm should be administered even if it offers a chance of only 5 per cent. of doing good to the patient. That is the practical side of the physician. But the same physician must learn to be critical and not to draw conclusions from the mere fact that the patient who received a certain medicine recovered from his disease; he may have recovered in spite of the medicine and not because of it. Finally, a pharmacologist should not teach too much; he should not teach pharmacology from big volumes. The pharmacologist himself should know which things are most essential to the physician and confine himself in teaching mostly these essential things. But the student should have a knowledge of these things on the tip ends of his fingers. Pharmacology and therapeutics should not be separated into

two disciplines. Pharmacology should be taught for its practical application first and for knowledge second.

Dr. Bernard Fantus, Chicago: There is a great deal of importance and truth in what Dr. Meltzer has just said. However, his specifications of requisites for the teacher of pharmacology, I fear, are quite impossible of realization. Life is too short for a man to become a laboratory expert and a clinical expert as well. Many of our present teachers of pharmacology are, unfortunately, not even competent to teach in the whole domain of pharmacology. Many of them are merely students and teachers of pharmacodynamics, that is, the study of the action of drugs, and know very little about pharmacy or prescribing. The result is that these vital topics are not taught properly. The pharmacologist is essentially a laboratory man; and, as such, cannot be, at the same time, a clinician. The teaching of therapeutics should be in the hands of clinicians. To place it, as has been done in some institutions, in the hands of the pharmacologist is, in my opinion, an unfortunate and pernicious practice.

Dr. Arthur D. Hirschfelder, Minneapolis: In regard to the points that Dr. Sollmann made as to the effect of drugs on students themselves: I agree thoroughly with what he said about the fact that there is only a limited number of drugs in which that method can be used without danger of getting the student into the toxic stage. If I emphasized the feature of pathologic physiology in my paper, it was in contradistinction, or rather, in contrast to those experiments in which we are confined entirely to perfectly normal conditions. I think one of the most important things we do in teaching the students with this experimentation on themselves is to find the dose, and the student who has worked on himself with a good sized dose and obtained no effect will not go on and prescribe one one hundred and fiftieth or one two hundredth of a grain of atropin and be satisfied with it. He wants to get the effect. It is what they do not get in those experiments on themselves which is really more important than what they do get. In regard to simplicity of experimentation, I agree with Dr. Sollmann, except that I say we should select only those experiments in which the results are sufficiently striking to get clinical effects. We might as well train the student to use his eyes for pharmacologic effects wherever we can do it in laboratory experimentation.

There is one thing in connection with this question that I think is worth while considering. That is when the student goes out of school, he goes with the idea that research must not be limited entirely to the very best equipped laboratories.

What I have said has applied only to the question of the routine course. Besides that, we have an elective system, and in the electives we assign definite problems to groups of students, a repetition of some interesting features of work that has been published, or, perhaps, modern research, sometimes physiology on animals, sometimes on themselves, and sometimes purely chemical.

As regards the question of the naval hospital corps, I did not have time, and I would probably not, if I had had time, give these students more than a very few of the more striking demonstrations. In the main, we reduced the subject to its very lowest terms, in words of one syllable, but maintained the physiologic viewpoint. As regards the pharmacologist in teaching, even the physiologist who has never had any relation at all to clinical medicine, if he cultivates just a little bit of interest in the problems of pathologic physiology relating to common types of clinical cases, will be able, without departing from his chosen career at all, to introduce a great deal of that phase of the subject into the teaching of his students, and I think in that way can add a great deal to the interest and to the usefulness of the subject.

Bullet in Bladder Wall Ten Years.—The bullet was not found at the operation three days after the accident although it was known to have entered the woman's bladder. Ten years later it had to be removed as it had formed the nucleus of a very large phosphate stone embedded in the right wall. The case was reported by Œconomos at a recent meeting of the Medico-Surgical Society of Greece.

EARLY DIAGNOSIS AND INTRAVENOUS SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS*

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In large cantonment hospitals where clinical material can be controlled by military methods, where acute disease in large volume may be studied in its earliest as well as its later stages, where necropsy study is possible and where elaborate laboratory equipment is often lacking and the medical officer thrown in consequence on his own resources, bedside observation may well add to the store of medical knowledge.

At the base hospital, Camp Jackson, S. C., attention has been focused on epidemic cerebrospinal meningitis. More than 270 cases of this disease have been studied with the result that a more definite idea of its general character has been established, methods of diagnosis of value have been brought into use, and a more successful treatment has been carried out. This paper is based on the study of the first 265 cases of meningococcus infection observed from November, 1917, to June, 1918. Some of our results have been published in earlier reports.[1]

In the historical development of the knowledge of this disease, the fact that meningitis due to the streptococcus, the pneumococcus, the tubercle bacillus and other organisms is always secondary seems to have been left out of account. The weight of opinion has inclined to the view that meningococcic meningitis is a primary disease; that the organism finds its way from the nasopharynx to the meninges directly through the cribiform plate of the ethmoid bone, or by bloodstream transport, the resulting morbid process being local rather than systemic. This was our point of view when the epidemic came upon us in November, 1917. It soon became apparent, however, that the disease with which we were dealing was not a primary meningitis but a meningococcic sepsis with a secondary meningeal localization. As the epidemic continued and our study widened, this opinion became firmly fixed.

The principal arguments in favor of this view may be briefly summarized. About 45 per cent. of our cases have been recognized before meninigitis developed. The duration of the stage of generalized systemic infection without meningitis may vary from a few hours to many days; in the average case it is about forty-eight hours. One of the most extraordinary of our cases had symptoms of a general infection with meningococci in the blood stream two weeks before meningitis developed. The blood culture is positive in about one third of the cases in which this is carefully made.[2]

* Read before the Section on Practice of Medicine at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Herrick: The Epidemic of Meningitis at Camp Jackson, The Journal A. M. A., Jan. 26, 1918, p. 227; The Intravenous Serum Treatment of Epidemic Cerebrospinal Meningitis, Arch. Int. Med., April, 1918, p. 541.

2. By special care in preparation of mediums and other details, Marshall A. Barber, Captain, S. C., N. A., and J. F. Fleming, First Lieutenant, M. R. C., have obtained positive blood cultures in twelve of the last fifteen cases. Recent experience would indicate that with early diagnosis and proper laboratory technic the meningococcus may be grown from the blood in from 50 to 80 per cent. of all cases of epidemic meningococcus infection.

Certain signs and symptoms point to a widespread infection. The petechial rash, the arthritic pains and the complications, such as panophthalmitis, arthritis, pericarditis, endocarditis, pneumonia, pleurisy and orchitis, most of which lesions have shown the meningococcus locally, indicate that in this disease the organism is widely disseminated by the blood stream. A considerable number, about 4 per cent., of examples of meningococcus infection in our experience have not shown meningitis. The notable effect of intravenous serum therapy, particularly in the more severe systemic types of the disease, is added argument. Corroborative reports have also appeared from Europe, where Thomsen and Wulff,[3] Netter,[4] and Aimé and Chéné[5] have contributed added evidence favoring the point of view expressed. Previous to our observations,[1] however, such a conception of the character of this disease had not been used as a basis for diagnosis or treatment.

If meningococcus meningitis is a metastatic or secondary local inflammatory focus, the primary stages of the disease, the sepsis, should be recognized. This we have found possible in a considerable proportion of the cases. Conditions obtaining in a large cantonment in which cooperation between division and regimental surgeons and a base hospital is possible afford opportunities for the study of inaugural symptoms of acute disease that are denied the staffs of civil hospitals. It may be that the diagnosis of this stage of sepsis will seldom be made in civil life. Nevertheless its possibility should be borne in mind and the clinical picture repeatedly brought to general notice.

CHARACTERISTICS OF THE DISEASE

In our experience, meningococcus sepsis is usually characterized by a prodromal period of malaise, of languor, with frequent upper respiratory tract infection, as tonsillitis, pharyngitis or laryngitis, which for a few hours or even days may not incapacitate. Rapidly or gradually the patient becomes ill, weakness increases, and with this, apathy. He likes to be let alone, may be a trifle morose, and loses interest in his ordinary pursuits. There may be diarrhea, tonsillitis or, as in four of our cases, conjunctivitis of meningococcic origin. The temperature rises, but is rarely above 102: the average of our epidemic was 101. Headache, usually frontal, may be present and is described as "bursting." This symptom, however, may be absent. The conjunctivae are reddened, the eyes dull, the pupils usually dilated, the pharynx and tonsils red and in some instances swollen. The tonsillar crypts may contain a grayish exudate. The tongue is coated. The oral secretions are sticky and viscid so that the tongue and palate may be connected by strings of sticky, mucoid saliva. The attitude, manner and facies are perhaps the key to the diagnosis. A dull apathy is always present. The patient is conscious when roused, but lapses promptly into silence and immobility. He does not modulate his voice. He does not use the muscles of expression in responding to questions. There is a striking suspension of all voluntary physical and mental activity. The patient lies on his side with the head bent forward and the knees drawn up, shielding himself with the bedclothing. In several of our cases the disease began as an acute pneumonia, in two as an acute polyarthritis.

In the presence of an epidemic, the one sign of almost diagnostic value is a petechial rash, which was present in about half the cases. This comes out rapidly in crops over the trunk, more rarely the extremities, face, conjunctiva and mucous membrane of the mouth. At necropsy this rash is found on all the serous surfaces, pericardial, peritoneal and pleural. The spots vary in size up to an inch in diameter. In two cases they assumed the form of large vesicles on hemorrhagic bases with scarring on fading. In some of the milder cases there has been a maculopapular rash resembling large rose spots or the beginning eruption of chickenpox. In the severest cases purpura may cover a large portion of the body surface.

The ill balanced activity of the deep reflexes is very characteristic. To illustrate, the right abdominal reflex may be absent, the left normal or increased; the right knee jerk exaggerated, the left normal; the Achilles jerks may be hyperactive and unequal. The inequality of the deep reflexes with a tendency to exaggeration is a very striking feature of this disease and is of the utmost value in early diagnosis, although great care is necessary in estimating inequality. Specific signs and symptoms of meningeal irritation—Kernig's, Brudzinski's stiff neck, etc.—are very often lacking during the early period of the infection.

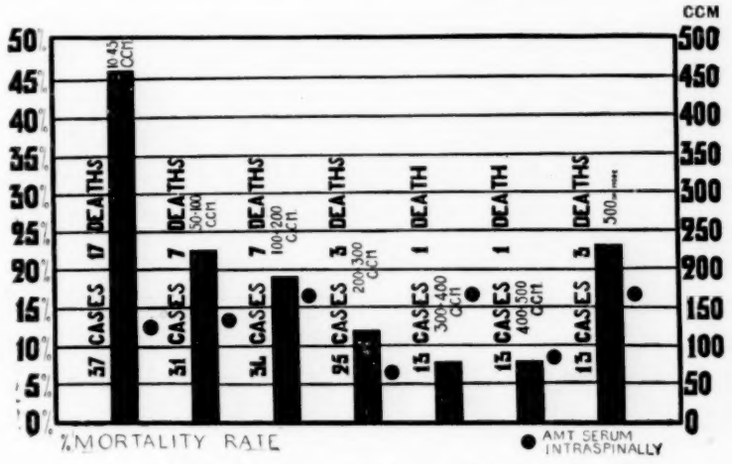

Chart 1.—Mortality in cases treated intraspinally and intravenously.

The spinal fluid in the stage of sepsis, as in other acute febrile diseases, may or may not be under increased pressure and may or may not show a trace of globulin. The cells are not increased and are lymphocytes. After centrifugation and evaporation on the slide of the last cubic centimeter of the contents of the centrifuge tube, fixing and staining, one may find a few extracellular diplococci, which are usually atypical in form and size. If organisms are not found in the fluid obtained by the first lumbar puncture, they frequently appear in that obtained by the second performed three or four hours later.

That the meningococci first invade the cerebrospinal spaces in the region of the choroid plexus seems clear from our observation that repeated puncture at intervals of two hours in many instances brings down the

3. Thomsen, O., and Wulff, F.: Meningococcus Infection and Meningitis, Hospitalstidende, 1917, 60, 1192; abstr., THE JOURNAL A. M. A., Feb. 16, 1918, p. 498.
4. Netter: Epidemic Meningitis with Purpura, Rev. de méd., 1917, **35**, 33.
5. Aimé, H., and Chéné, H.: Parameningococcus Septicemia, Paris méd., 1918, **8**, 118; abstr., THE JOURNAL A. M. A., April 13, 1918, p. 1125.

organisms by drainage. In two fulminating cases with speedy death, the spinal fluid obtained by lumbar puncture shortly before death contained no organisms, while that secured at necropsy from the lateral ventricles showed numbers of meningococci.

The inaugural symptoms of acute lobar pneumonia are very like those of meningococcus infections, but apathy is less marked, skin lesions are absent, the deep reflexes, though exaggerated, are usually equally active on either side of the body, and the spinal fluid, though often under increased pressure and containing globulin, gives negative bacteriologic findings.

METHOD OF TREATMENT

Diagnosis having been arrived at by joint clinical and laboratory methods, treatment is begun at the earliest moment possible. No medical emergency demands action more prompt, vigorous, unremitting. Knowledge of and attention to detail brings greater reward in meningococcus sepsis than in almost any other infectious disease. In addition to reduction of mortality, important objects in the treatment of cerebrospinal meningitis are the decrease in the number and severity of the complications and the shortening

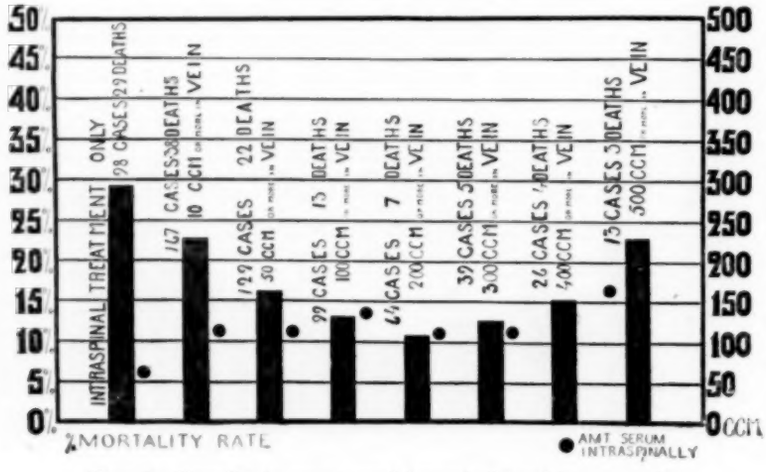

Chart 2.—Mortality in cases treated intraspinally and intravenously.

and mitigation of the course of this extremely painful disease.

To accomplish these aims we have based treatment on the conception of the nature of the disease which seems to have been established by observations at the base hospital, Camp Jackson—that the disease is primarily a blood stream infection and, at least in its early stages, should be treated as such. For the success of treatment based on this principle an early diagnosis is important, though not absolutely necessary, as will subsequently appear.

The diagnosis having been established with the least possible delay, the attempt is made to sterilize the blood stream by massive doses of antimeningococcus serum introduced intravenously. The general plan of treatment is as follows: The patient is desensitized by the injection of 1 c.c. of serum subcutaneously. One hour later from 80 to 150 c.c. are given by vein, the first 15 c.c. at the rate of 1 c.c. per minute. The remainder is allowed to flow more rapidly. In the severe cases the injection of this volume of serum is repeated every eight to twelve hours, in the mild cases every twenty-four hours, until the symptoms are under control. The average number of intravenous injections given is four and a half, the average total amount of serum is 400 c.c. The greatest number of intravenous serum injections given in any case is twelve; the highest total amount of serum, 1,050 c.c.

Does antimeningococcus serum sterilize the blood? That this desirable end is accomplished is shown by the results of blood cultures.

In all of our recent cases a blood culture has been made on admission before serum treatment was begun. Approximately one third of such first cultures have been positive. A second culture has been made twenty-four hours later—after from one to three large intravenous injections have been given. In no case has this second culture been positive.

If the spinal fluid is clear there is no interference with the central nervous system. So soon as meningitis develops, lumbar puncture is performed about half an hour after the intravenous injection. Sufficient fluid is withdrawn to reduce the pressure to an approximate normal, and rarely more than 30 c.c. of serum are introduced into the spine. The average number of spinal punctures in the cases treated by this method is seven; the average number of intraspinal serum injections, four. The freest possible drainage is aimed at after the intravenous injection of serum. Since the permeability of the inflamed choroid plexus for antibody has been quite well established, it is believed that drainage at this time results in the introduction of a considerable amount of antibody from the blood into the cerebrospinal spaces. Satisfying proof of this is the prompt disappearance of meningococci from the spinal fluid when these massive intravenous injections are given. With infrequent exceptions the meningococci are not found after the first forty-eight hours. Under the older methods of treatment they were present for a longer time in the average patient.

IMPORTANT POINTS IN INTRAVENOUS SERUM TREATMENT

1. It must be employed with boldness, yet with care. One must be prepared to give from four to eight massive injections by vein of from 80 to 150 c.c. during the acute stages of the disease or a period of from two to four days. There is much more danger in insufficient than in excessive intravenous serum administration. We have, in fact, in 128 cases so treated, had no serious serum effects. Our regrets have been that serum was not more freely used in many of the early cases.

2. The desensitization by subcutaneous injection of 1 c.c. of serum one hour before the introduction of serum into the vein and the cautious injection of the first 15 c.c. at the rate of 1 c.c. per minute are the secrets of safe intravenous serum therapy. Immediate stopping of the injection with the appearance of dyspnea, pallor, cyanosis, vomiting, weak, rapid or irregular pulse or other immediate serum effects is essential. Renewal of the attempt after two or three hours is rarely unsuccessful. Even those patients thoroughly sensitized to serum by earlier courses of treatment can be treated safely with these precautions. It is desirable to give morphin and atropin before the injection, but they are not absolutely necessary. It is well to have these drugs at hand in case of dyspnea or other symptoms of discomfort following the treatment. Epinephrin also should be available.

3. A knowledge of when to stop treatment is important. Harm may result from too much as well as from too little treatment. Particularly is this true of intraspinal injections. The number of convalescents that show evidence of a subacute or chronic caudal myelitis in weakness, atrophy of muscle groups, local vasomotor disturbances, and exaggerated or otherwise altered reflexes of the lower extremities is sufficient to compel attention to the danger of too active interference with such a delicate and vulnerable structure as the cauda equina. One great advantage of intravenous treatment is that the number of intraspinal treatments is reduced. In two serious cases no serum was used intraspinally, drainage being carried out only by lumbar puncture, and reliance being placed on intravenous injections Both patients recovered. We are, however, far from advising abandonment of intraspinal treatment. In fact, all our experience confirms its importance and effectiveness. The local treatment of meningococcus infections when foci are established in meninges, joints, pericardium or other accessible regions is most effective and must not be neglected by too great attention to the blood stream invasion.

In those prolonged cases in which meningococci persist in the spinal fluid and in which the patients are made uncomfortable by intraspinal injections, showing increased opisthotonos, and severe pain in the head or back or lower extremities following the treatment, it is better to omit all interference. At times drainage may be necessary with or without further intravenous injections. Many of these prolonged cases apparently become intolerant of intraspinal serum injections. If satisfactory response does not follow a series of eight or ten intraspinal treatments, it is generally best to cease injecting serum intraspinally, continuing drainage only if there is discomfort from increased intracranial pressure or apparent danger of blocking the foramina.

In relapsing cases the entire cycle of treatment must be repeated with the same thoroughness and care used in the initial course. The organism cultivated from the blood or spinal fluid may be used to determine the presence of agglutinins in the serum employed. Valuable evidence can thus be obtained as to the specificity of the serum for the strain of meningococcus present. This is of the highest importance. Therapeutic results seem to parallel the agglutinin content of the serum for the special strain of meningococcus involved. Commercial serums are frequently lacking in high agglutinin content, and their therapeutic effect is often disappointing. In the absence of desirable results from a given serum, use should promptly be made of serum from another source. This may be of vital moment to the patient. The standardization of serums by governmental authority is an urgent need.

4. Other more general methods of treatment are not to be neglected. Morphin is given without stint to disturbed patients during the first twenty-four or forty-eight hours to control violent symptoms. Large amounts are well tolerated. Chloral and bromid are likewise useful. Of great importance is an adequate supply of liquid. Patients will drink almost without limit, and despite this their tissues often seem to lack fluid. In some of these almost desiccated cases, First Lieut. Arthur M. Dannenberg, M. R. C., has suggested and successfully used intravenous injections of physiologic sodium chlorid solution with or without sodium bicarbonate. Abundant food is required.

RESULTS OF TREATMENT

Of 265 cases, 137 were treated by the older methods of intraspinal therapy alone (Class A), or combined with extremely small amounts—from 10 to 45 c.c.—of serum intravenously (Class B), amounts of serum which given by vein have in our experience little or no influence. One hundred and twenty-eight cases were treated by the combined intraspinal and massive intravenous serotherapy (Class C). Of the 137 cases treated by the older methods, forty-seven patients died, a mortality of 34.3 per cent. Of the 128 treated by the newly developed methods, nineteen died, a mortality of 14.8 per cent.

Cases have been divided roughly into mild and severe according to the intensity of the symptoms, their duration and the presence of important complications.

The mild cases do well under either form of treatment. In fact, figures are slightly in favor of the intraspinal methods in such cases. Of sixty-seven mild cases treated by intraspinal methods alone, one patient died, a mortality of 1.4 per cent. Of thirty mild cases treated by the new methods, two patients died, a mortality of 6.6 per cent. It is in the treatment of the severe types of meningococcic infections that the intravenous methods have the most brilliant results. Of seventy severe cases treated by the older methods, forty-six died, a mortality of 65.7 per cent. Of ninety-eight severe cases treated by the newer methods, seventeen died, a mortality of 17.3 per cent. This happy result in the severe types of meningococcus sepsis deserves particular emphasis. The reduction of mortality from 65.7 to 17.3 per cent. in a similar class of cases is noteworthy.

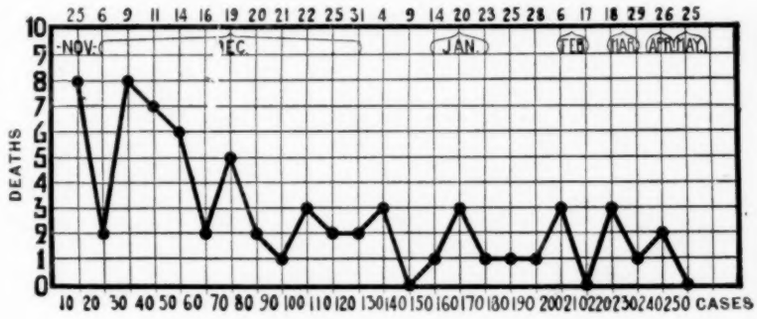

Chart 3.—Mortality rate by tens.

Of the entire 265 cases here reported, 105 were identified before meningitis developed. Seventeen per cent. of these patients treated by all methods died. Of the 160 patients in whose cases treatment by any method was begun after meningitis developed, 30 per cent. died. By this the importance of beginning treatment during the premeningitic stage of sepsis is emphasized. On the other hand, of seventy-six cases recognized late, that is, after the clouding of the spinal fluid, 42.1 per cent., or thirty-two patients treated by the older methods, died. Of eighty-four patients of the same type treated by the newer methods described, 19 per cent. died. This comparative mortality in groups of similar cases, of 42.1 per cent. in one and 19 per cent. in the other, shows that the modified treatment described is of benefit even in those cases in which the disease has begun or accomplished

its characteristic selective localization in the meninges. A consideration of importance in this connection is the frequency of positive blood culture in advanced cases, with late recognition. A further point is the late development in many instances of hematogenous foci of suppuration in eye, pericardium, joints or elsewhere.

Table 1 is a statistical summary of the epidemic, giving the mortality in cases classified according to severity, stage of the disease in which diagnosis was made, and method of treatment used.

EFFECT OF TREATMENT ON COMPLICATIONS

In cerebrospinal meningitis not only is life in jeopardy but also the future usefulness of the patient is at stake by reason of the number of complications which may permanently handicap those who recover. Complications of a crippling character are practically always the sequel of the localized process in the central nervous system. The most vulnerable structures are the cranial nerves, which are involved in this order of frequency: sixth, third, second, eighth, seventh. Next in order of importance among the complications is the blocking of foramina with consequent partial or total hydrocephalus. Of interest and military value are the persistent spinal cord symptoms. Many of the convalescents show evidence of a caudal myelitis. In one paraplegic case with necropsy the cauda equina was matted together with a hemorrhagic fibrinopurulent exudate. Symptoms of this myelitis are pain in the back and lower extremities, weakness of the muscles of the thighs and legs, especially the hamstring muscles and quadriceps, frequent atrophy of muscle groups, vasomotor disturbances and altered reflexes. These symptoms may persist for months. Some of the disabilities are doubtless permanent, especially those showing atrophy. They are the apparent result of needle traumatism, irritating serum and local meningococcus infection.

TABLE 1.—MORTALITY IN CASES CLASSIFIED ACCORDING TO SEVERITY AND METHOD OF TREATMENT USED

	Entire Epidemic		Classes A and B*		Class C†	
	No.	Per Cent.‡	No.	Per Cent.	No.	Per Cent.
Number of cases	265	....	137	....	128	....
Deaths	66	24.8	47	34.3	19	14.8
Mild cases	97	3.0	...	....	...	....
Early diagnosis	59	3.3	41	2.4	18	5.5
Late diagnosis	38	2.5	26	0.0	12	8.3
Severe cases	168	37.4	...	....	...	....
Early diagnosis	46	34.7	20	70.0	26	7.6
Late diagnosis	122	38.5	50	64.0	72	20.8

*Classes A and B comprise cases treated by intraspinal methods alone or with only 10 to 45 c.c. of serum intravenously.

†Class C comprises cases treated intraspinally and with from 50 to 800 c.c. of serum intravenously.

‡Percentages are mortality rates.

Of the complications due to the blood stream infection, panophthalmitis is most important since it results in loss of vision in almost all cases. Of less permanent consequence are pericarditis, endocarditis, arthritis, orchitis, pleurisy, pneumonia and peritonitis. These are factors in the acute stages of the disease, but are uncommon during convalescence.

Table 2 shows the comparative frequency of the important complications in the classes of cases treated by the different methods. The four cases of panophthalmitis occurring in Class C were in cases early in the epidemic not given the fully developed treatment. In the last fifty cases treated by large amounts of serum by vein, no instance of panophthalmitis was observed.

The optimal amount of serum to be employed by vein or spine is graphically illustrated by Charts 1 and 2. With increase in the amount of serum used intravenously, there is decrease in the mortality, which is quite marked up to a certain point. At a dosage of about 400 c.c. by vein and 125 c.c. by spine, the mortality is lowest. With larger amounts the mortality rate again rises. The explanation of this later rise is, in our opinion, that the more severe cases receive the more active and prolonged treatment rather than that harm results from the larger dosage of serum.

Treatment of meningococcus infections by this new method, after all, is a matter of judgment in each individual case and cannot be reduced to a mathematical formula. The only general statement that one can safely make is that the average case requires from 400 to 600 c.c. of serum by vein and about 100 c.c. by spine. To give less amounts is to deny the patient the benefit that follows energetic and thorough carrying out of the ideas of therapy developed during our year's experience with 265 cases.

The mortality rate at different periods of the epidemic is made graphic by Chart 3.

TABLE 2.—FREQUENCY OF COMPLICATIONS

Complications	Classes A and B	Class C
Panophthalmitis	7	4
Pericarditis	8	3
Endocarditis	1	0
Pneumonia	12	8
Pleurisy	2	0
Peritonitis	2	0
Otitis media	8	3
Arthritis*	7	9
Hydrocephalus	2	2
Paralysis, transient or permanent	3	4
Deafness	4	2
Gangrene of toes	0	1

*Including serum arthritis.

Acknowledgment is made of the services of the following officers in the epidemic here reported: In the laboratory, Major F. W. Baeslack, M. R. C.; Capts. A. H. Bunce, M. R. C., and Marshall A. Barber, S. C, N A.; First Lieut. J. F. Fleming, M. R. C.; in the clinical work, Major George A. Blakeslee, M. R. C.; Capts. D. L. Walker, H. S. Fincke, E. W. Barron, B. Lattin, G. M. Parkhurst, F. W. Rogers, Q. H. Barney and L. H. Taft, and First Lieuts. A. M. Dannenberg, R. C. Davis, S. A. Cobb and C. E. Woodcock, M. R. C. I am indebted to Miss Edith L. Vincent, Reserve Nurse, A. N. C., for valuable work on statistics and records.

ABSTRACT OF DISCUSSION

Dr. J. Birney Guthrie, New Orleans: The conclusion Major Herrick draws that meningitis is a blood infection first of all, a general sepsis, is, in the main, correct. I will go further and state it as my belief, based on the 138 cases that we had at Camp Beauregard, that the condition is in its beginning a respiratory infection. I believe we are justified in using a term which I have applied—meningococcus grip. We are familiar with a certain picture which we call grip. This does not convey the idea of a specific disease. We know that the clinical picture of grip is one that can be produced by various organisms. There are sufficient data at hand to justify the term, meningococcus grip. This is certainly the clinical picture that Major Herrick drew. There is nothing characteristic in the initial symptoms of any specific infective agent. The flushed face, the hebetude, the dry tongue; in fact, the whole picture is certainly not a specific one. It brings up nothing but an infection. The most frequent mistake in the diagnosis previous to admission to the hospital was calling a pneumonia case "meningitis suspect." The picture of the pneumonia case is the picture, as we saw it, in this pre-meningitis stage of Major Herrick's. The conclusion comes, as one watches such cases, that there exists this stage of sep-

ticemia in meningococcus infection. The prostration is greater than one sees in grip infections due to Pfeiffer's bacillus. It was my own observation and the experience of others that we often made initial spinal punctures and found clear fluid, later to see the picture develop into that of typical meningitis with cloudy fluid and organisms. I cannot agree with the major in his conclusion that the occurrence of a rash stamps the case as a severe one. The rash occurred in 50 per cent. of our cases. Some of the cases of severe rash yielded promptly to treatment and should be classed as mild.

A question of great importance is reinfection. The cerebrospinal meninges may harbor these organisms intact and later allow them to develop and break out again, producing a widespread reinfection of the meninges. We have seen that occur in a number of cases. I believe that the idea of abandoning the initial therapeutic puncture and injecting serum into the cerebrospinal canal is wrong. I think we should give the serum by this route anyway. If organisms are found in the blood stream it would be the safest plan to follow. Theoretically, it would seem to be indicated. The breaking down of the meningeal choroid complex, Major Herrick assumes, is a result of the meningococcus infection. I do not think this is correct, or that this occurs in the absence of a local nidus of infection on the choroid plexus. We know that the introduction of horse serum into the cerebrospinal canal does affect the permeability of the meningeal choroid complex from the blood to the cerebrospinal canal. This would constitute an additional indication to carry out the injection of the serum early into the cerebrospinal canal, to be followed by repeated introduction of serum by both intravenous and intraspinal routes.

DR. P. S. SCHENK, Norfolk, Va.: I should like to ask Major Herrick what his opinion is in regard to the control of carriers. Beginning in January of this year we had quite an outbreak of meningitis at the Naval Base, near Norfolk. This outbreak was followed by about forty cases in Norfolk. There were over 400 direct contacts in the homes of these cases, but we did not have a single case develop in any of those contacts. At the Naval Base, and also in Norfolk, we were very careful in ferreting out the carriers, yet notwithstanding the fact that they had a very large number of carriers at the Naval Base, it does seem that the carrier proposition has no particular influence on the incidence of the disease. In the several cantonments throughout the country, where meningitis prevailed, it was a striking fact that in many of those where there were the greatest number of carriers they had the fewest cases. We have not had a case of epidemic meningitis in Norfolk for many years previous to this outbreak at the Base. We traced 90 per cent. of our cases, however, directly to this source; either the brother, father, husband or some other member of the family who developed the disease in Norfolk, worked at the Base. It is a well-established fact that it is extremely rare to contract a case of meningitis directly from another case of developed meningitis. It seems to be a disposition to ignore the carrier, except, perhaps, those that had been in immediate contact, and yet not a single one of our cases had been in contact with a person who had been directly exposed to the disease.

DR. W. L. BIERRING, Des Moines: I want to call attention to an interesting observation by Dr. Preble presented to this section a number of years ago on the clinical similarity between acute pneumonia due to the pneumococcus and epidemic cerebrospinal fever, in that way establishing a relationship between the two causative organisms. Both diseases are ushered in by a chill, followed by a rapid rise in temperature; both have a similar fever curve, with a drop by crisis. A polymorphonuclear leukocytosis and a chlorid retention is peculiar to both conditions, and each corresponding in time to the fever course. The cultural characteristics of the two causative organisms are practically identical. All of which offers an explanation of the early finding of the meningococcus in the blood stream, suggesting a hematogenous infection, which gives to it the same conception that is held for pneumococcus infections. Furthermore, it bears out the good therapeutic results reported in Major Herrick's paper.

COL. F. F. RUSSELL, Washington, D. C.: I do not know that this is the best time to consider the carrier question. Dr. Herrick's paper is so important in itself. I do not think the profession has yet agreed as to what is the best way to handle the carrier. I think all of us agree that without the carrier we would have no spread of the disease. We must recognize the carrier and control him. The difficulty is to know which carrier is the serious one and which one is negligible. We know that some carry pure cultures constantly and others harbor only a few organisms. It seems, therefore, that the chronic carrier with large numbers of meningococci regularly present is dangerous. If we can take care of that man, we will cut down the number of cases. If you study the statistics of last winter you will find that at those places where the carrier work was done early the epidemic diminished. There were one or two camps where the epidemic continued longer than the average; and I think in those you will find that they did not control their carriers as in the places where the epidemic stopped.

DR. W. W. HAMBURGER, Chicago: Does Major Herrick consider that all cases of meningitis are primarily cases of sepsis? For instance, at Camp Taylor, we had forty-six cases and we made early blood cultures, eight or ten in all. In none of those blood cultures was there a positive finding of meningococci, and in all of these cases there was no rash, except in one case, in which there was urticaria. Our mortality in these cases was 16 per cent. treated by the old method. I would like to know whether Major Herrick considers that all cases of cerebrospinal meningitis are primary sepsis and secondary meningitis, and whether he would feel that they should all be treated intravenously in addition to intraspinally.

DR. WILLIAM W. HERRICK, New York: I am glad that Colonel Russell treated the question of carriers, because I have not made up my mind about it. I believe that meningitis is primarily a sepsis just as pneumonia is a blood stream invasion by the pneumococcus. I believe that every case of meningitis, no matter in what stage recognized, should have intravenous treatment. We began our treatment with the commercial serums. They did not have a satisfactory effect. We were then fortunate enough to get a supply from the Rockefeller Institute and the New York City Board of Health, which gave better results. Later in the winter we returned to commercial serum, which by that time seemed to have improved. We now use the serum from the Rockefeller Institute, that from the New York City and state boards of health and two or three commercial serums. If a given case does not respond promptly to one serum, we change and give serum from some other source. That is a point of very great importance in the treatment of the disease. The largest intravenous dose has been 150 c.c. The greatest number of such doses in any one case has been ten. The greatest total amount of serum given to any individual has been 800 c.c.

As to the criteria of mild and severe cases, that is a rough clinical judgment depending on the severity of the symptoms. The respiratory tract infection is most important. It is common in by far the larger proportion of the cases. This phase of the disease requires study. The similarity between pneumonia and meningitis came very prominently to our attention early in the epidemic. We thought we had made a discovery, but later found that Dr. Osler had described this many years ago.

The repetition of the cycle of treatment in the resistant cases is most important. If it is a case of reinfection, repeat the whole course vigorously and persistently. We have had a number of these cases. One patient has had three attacks of the disease since last December. We have noticed no hemorrhagic vomitus. Hemorrhages into the meninges have not been a feature in the epidemic. In only one of our thirty-seven necropsies was hemorrhage a factor in the death.

Red Cross War Fund Totals $176,528,158.—The Red Cross issues the following: The total of the second Red Cross war fund continues to grow, and the returns still are incomplete. Reports from the various divisions received since the last figures were printed, July 1, show contributions amounting to $176,528,158.

DIGITALIS THERAPY *

JOSEPH H. PRATT, M.D.
BOSTON

In the year 1785 a small book was published in England entitled "An Account of the Foxglove and Some of Its Medical Uses." It was written by William Withering,[1] a distinguished physician of Birmingham. In the preface he states that "the use of the foxglove is getting abroad and it is better the world should derive some instruction, than that the lives of men should be hazarded by its unguarded exhibition, or that a medicine of so much efficacy should be condemned and rejected as dangerous and unmanageable." He presented careful notes on 163 cases of dropsy in which digitalis was given, and describes the method of collecting, preparing and administering the drug. It was in dropsy of cardiac origin that he exhibited this drug with remarkable success. They were, as he says, "cases lost to the common run of practice and only snatched from destruction by the efficacy of digitalis." He reported his failures as well as his successes.

He recognized that digitalis did not have a diuretic action in all cases of dropsy and that the best results were obtained if "the pulse be feeble or intermitting, the countenance pale, the lips livid, the swollen belly soft and fluctuating or the anasarcous limbs readily pitting under the pressure of the finger." His book carries conviction to the reader that the writer was a keen and accurate observer and "without any unjust predilection in favor of the medicine."

Until recently I did not know that Withering's splendid work was practically unnoticed by teachers and students of cardiac disease, in England and America at least, for more than a century. It would be an interesting quest to find and do honor to the man who discovered Withering and impressed the world with the value of his work. Hope, Stokes, Latham and Walshe and our own Austin Flint, masters of medicine though they were, paid no attention to Withering's teachings and never discovered for themselves the great value of digitalis in cardiac failure when properly administered. The neglect of this drug and of Withering's discovery until modern times is a striking illustration of the difficulty that new truths sometimes have in gaining acceptance.

I first learned of William Withering and his work on digitalis from my teacher and friend, Sir William Osler. One day while in Boston, although he had only a few hours in the city, he proposed that we go to the Medical Library and look up old Withering's book. With characteristic kindness and helpfulness he wanted me to learn from those striking case reports the value of digitalis when properly administered. In the first edition of his textbook, Osler gives the credit due Withering for introducing digitalis into practice.

In the first general treatise on heart disease to be published in English, that of Allan Burns,[2] Edinburgh, 1809, the only reference to Withering is the following sentence: "We often find, that in the early stages of dropsy, while the patients are, as Dr. Withering observes, robust, and of firm fiber, that the diuretics make no impression, but that when the strength is more wasted, the very same medicines cure the disease."

It is true that, as a number of recent writers have pointed out, Burns in another place does declare that digitalis has a very powerful effect in obviating the urgency of the symptoms in dilatation of the heart. But the force of this statement is weakened by the context. The remedy he relied on chiefly was a seton introduced into the precordial region. He did this, he says, to prevent the occurrence of inflammation, and adds, "With a similar view, we occasionally prescribe digitalis." If dropsy was present he gave diuretics, not trusting to digitalis alone, and in addition always administered laxatives joined with carminatives.

Digitalis will be of no real service in the treatment of heart failure unless it is given in an active form and in sufficient amount to produce a physiologic effect.

Withering in 1785 gave the following directions for the administration of digitalis: "Let the medicine be continued until it either acts on the kidneys, the stomach, the pulse, or the bowels; let it be stopped upon the first appearance of any one of these effects." Now it is an amazing fact that in spite of the extraordinary success with which Withering exhibited the drug according to this rule in dropsy of cardiac origin, Sir James Mackenzie, working over a hundred years later, was the first clinician to demonstrate conclusively the correctness of Withering's instructions regarding the administration of digitalis. For his studies on digitalis,[3] published in 1911, he records the careful and detailed observations in a series of cases treated with digitalis in his wards at the Mount Vernon Hospital, London. Convincing evidence was presented that the drug yielded brilliant results in certain forms of cardiac failure when pushed to the physiologic limit.

Withering concluded the preface to his great work with these prophetic words: "After all, in spite of opinion, prejudice or error, time will fix the real value upon this discovery and determine whether I have imposed upon myself and others, or contributed to the benefit of science and mankind." At length time has shown the real value of Withering's discovery, but it took 125 years to do it. For some strange reason difficult to explain, digitalis has been regarded as a dangerous drug in therapeutic doses by generation after generation of clinical teachers and writers. This fear of the drug explains the failure of most practitioners to obtain any benefit even in those conditions in which it gives the most brilliant results when properly administered.

Failure to obtain results in suitable cases is due (1) to the employment of too small doses and of an insufficient amount of the active drug, and (2) to the use of weak or inert preparations.

STRENGTH OF VARIOUS SAMPLES OF THE LEAF

During my student days I never saw a case in which striking improvement was produced by digitalis, nor did I ever obtain any undoubted benefit from its use during the first years of my practice, although I treated many cases of cardiac failure. Lack of success

* Read before the Section on Practice of Medicine at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Withering, William: An Account of the Foxglove and Some of Its Medical Uses, with Practical Remarks on Dropsy and Other Diseases, Birmingham, 1785, p. 207.

2. Burns, Allan: Observations on Some of the Most Frequent and Important Diseases of the Heart, Edinburgh, 1809, p. 102.

3. Mackenzie, James: Heart, 1911, **2**, 273.

caused me to try a number of different tinctures and infusions. Finally suspecting that the digitalis available in Boston was of poor quality, I had a local druggist import directly from Germany some of Merck's powdered digitalis leaf. I first gave it to a woman with auricular fibrillation and heart failure, who had been under observation for more than a year. It was a typical case with dyspnea, dropsy and a troublesome cough. In spite of the administration of digitalis I had never found the pulse rate below 120 during the preceding six months. Improvement from the new digitalis was noted in a few days. The pulse was slowed to 72 and the symptoms of cardiac failure lessened so that the patient was able to do her housework. That was in December, 1905.

Four years later I tested by the frog method nine samples of digitalis leaf obtained from six of the leading druggists of Boston and vicinity, and from two hospitals. They were all of low strength as shown by the biologic test.[4] The only strong digitalis leaf found on sale was the Merck preparation that was carried in stock by the single druggist who imported it. In 1909 a bottle of Caesar and Loretz's titrated (standardized strength) leaf was obtained from Germany and shown by a series of tests to be twice as strong as the best leaf furnished by American drug houses.

Although *Digitalis purpurea* grows wild in California, Oregon and Washington, we have always imported our supply from England and Germany. For some years before the war, German digitalis was coming more and more into use. No American house is yet supplying a digitalis so strong and so reliable as the titrated leaf put out by Caesar and Loretz of Halle. I used this almost exclusively from 1909 to 1915.

In 1916, I obtained some wild digitalis leaf that was collected in Hobart, Wash., by my friend, Dr. Harris B. Haskell. This proved to be very active; in fact, the leaf of the first year plants was as strong as any I have ever used. It was twice the strength demanded by the pharmacopeia.

In 1916 and 1917, Morrison and I studied twenty-four specimens of American digitalis, both wild and cultivated, grown in different parts of the country. Only six of these were stronger than the pharmacopeial standard, three of the required strength, and the remaining fifteen weaker. Of the three most active leaves, one was from Washington, one from Virginia and the third from the experimental station of the University of Minnesota. Our studies showed that cultivated leaf may be as strong as that of the wild plant. Two specimens of Washington leaf of the crop of 1916 were weak. In 1917, leaf gathered at the same place (Hobart, Wash.), and at the same season of the year and treated in the same way as the strongest leaf of 1916, was found to be so weak as to be valueless in ordinary therapeutic doses.

We have learned that active leaf can be obtained at times at least as far North and East as Portland, Maine, as far South as Virginia, in the Middle West and in the Rocky Mountains, and that good digitalis grows wild in great quantities in parts of Oregon and Washington. In spite of the fact that excellent digitalis both wild and cultivated grows on American soil the large wholesale drug houses supply an inferior digitalis, and there is great difficulty at this time, and there has been for the past year, in getting good preparations. Steps should be taken to remedy this difficulty. Specimens of wild Oregon and Washington leaf should be tested, and when found to be strong it should be gathered in large quantities. A good leaf may preserve its strength for several years. Tinctures deteriorate much more rapidly than the dried leaf.

4. Pratt, J. H.: Boston Med. and Surg. Jour., 1910, **163**, 279.

EMPLOYMENT OF DIGITALIS

For the past eight years I have followed the rule of Withering and pushed the drug until a physiologic effect was obtained. My experience with this method has demonstrated that large doses are not dangerous when the cases are carefully followed, and that the drug gives brilliant results in heart failure associated with auricular fibrillation, as Mackenzie has shown, and that it is beneficial in some cases of heart failure with normal rhythm.

In hearts with normal rhythm, slowing of the pulse is still generally regarded as a measure of digitalis action but my observations confirm the findings of Mackenzie[3] and Cohn and Fraser[5] that the drug rarely slows the pulse except in auricular fibrillation until toxic symptoms are produced. In auricular fibrillation slowing of the pulse in the vast majority of cases can be brought about readily and quickly if an active preparation is given in the proper amount. The action of strong digitalis in slowing the rapid pulse of auricular fibrillation is so definite that it furnishes a simple and reliable means for determining the activity of any digitalis preparation.

Physicians should learn to recognize the presence of coupled beats with the stethoscope. When they appear, the drug should at once be discontinued. The development of heart block may be followed by a striking improvement in the condition of the patient. Vomiting when induced by digitalis is quite distressing. It may be preceded by a day or two of complete anorexia. When this loss of appetite develops suddenly in a patient I usually discontinue the drug, knowing that it is an indication that the physiologic limit has been reached and that distressing nausea and vomiting will follow if more digitalis is given.

It makes no difference in what form digitalis is given, whether as the fresh tincture, or the powdered leaf in capsules or pills, provided an *active* leaf is used. The use of the infusion should be condemned. It has no advantages. It may upset the stomach and it loses strength quickly. If a tincture is employed, minims or cubic centimeters, not drops, should be used. As I pointed out in a previous paper, it usually takes from 35 to 40 drops to equal 15 minims or 1 c.c. if an ordinary medicine dropper is used. Recently I saw a case with a physician who thought he had given a rather large amount of digitalis in forty-eight hours to a patient, 2 c.c. four times a day, or 16 c.c. in all. He made the common mistake of reckoning 15 drops as 1 c.c. Investigation showed that it took 55 drops with the medicine dropper used, so the patient had received only 4.3 c.c.—less than a third of the calculated amount.

The ordinary dose of a strong digitalis preparation is 1 c.c. of the tincture or 0.1 gm. of the powder three or four times a day. The physiologic effect is usually obtained when 2 to 2.5 gm. of the leaf are taken within from five to seven days. If more rapid

5. Cohn, A., and Fraser, F.: Tr. XVII International Congress of Medicine, Sec. VI, Medicine, London, 1914.

action is desired, 1 gm. may be given within the first twenty-four hours.

I have occasionally used some of the weaker preparations in doses of 40 minims and even 1 dram without any result. I have given a tincture of digitalis supplied to the Army by a leading American pharmaceutical house in dram doses every three hours for twenty-four hours to a pneumonia patient without affecting the pulse or disturbing the stomach.

Whether a weak leaf in very large doses would yield as good results as a strong leaf in ordinary doses is unknown. This is a question that should be settled.

In auricular fibrillation, after the patient has been well digitalized the slow pulse should be maintained by the constant administration of sufficient digitalis to maintain the rate below 80 and to prevent the occurrence of a pulse deficit. In some cases the circulation is best maintained at a much lower heart rate. In one patient under constant administration of digitalis the pulse has rarely been above 50 during a period of two years.

Digitalis is indicated in every form of heart failure. The best results are seen in cases of auricular fibrillation. It rarely seems to be of benefit in myocardial weakness due to aortic insufficiency, but this valvular lesion is not a contraindication to its use, as was taught by Corrigan.

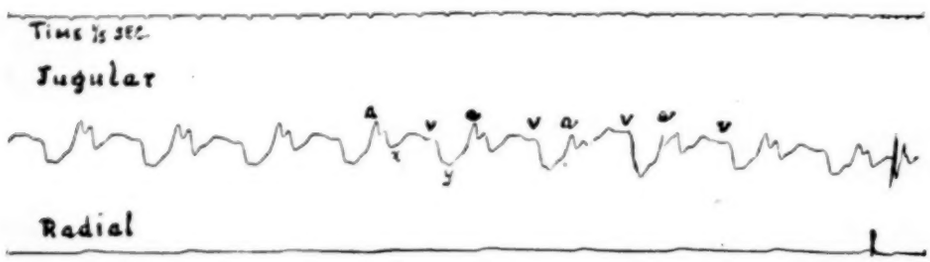

Fig. 1.—Tracing of jugular and radial pulses, taken March 8, showing a well marked venous pulse with a distinct *a* wave.

DIFFERENT PREPARATIONS

Many attempts have been made to substitute the single glucosids of digitalis for the crude drug in therapy. The "German digitalin" is a favorite with many physicians. This is a mixture of alkaloids of varying strength.[6] It is cheap, which may explain its popularity. It is sometimes put out in tablets of 1/100 grain for subcutaneous use, although 100 times that dose has been given without injurious effect. There seems no justification for its use.

The "French digitalin" is an entirely different substance. The fact that two different extractives are put out under the same name has led to much confusion. The French digitalin is obtained by the method of Homolle. It consists chiefly of pure digitalin (digitalinum verum of Kiliani). It is sold in the form of Natavelle's granules. Each granule contains 1/240 grain (0.25 mg.), and is equivalent to 1½ grains (0.1 gm.) of good digitalis leaf. It is a trustworthy preparation[7] and deserves more extensive use in this country.

Certain proprietary preparations of digitalis have had an extensive sale during the past ten years. Chief of these are digalen, digipuratum and digifolin. The first of these, digalen, has been most extensively advertised, and extravagant claims made for it. It has been found to be a weak digitalis preparation. The statement of the manufacturers that it does not produce nausea or vomiting in therapeutic doses seems justified by its lack of strength. The experiments of Hatcher and Eggleston[8] have shown that the gastric disturbances induced by digitalis are due to the action of the drug on the central nervous system and not on the gastric mucous membrane.

German digipuratum is an active digitalis made from carefully selected leaves, and the tablets contain the proper dose for ordinary use. Naturally physicians who had been employing weak tinctures obtained better results when they gave digipuratum. While using the strong titrated leaf of Caesar and Loretz, I never found any advantage in giving digipuratum.

Digifolin is a Swiss preparation that is similar to the German made digipuratum. Both produce nausea and vomiting when pushed, as do all forms of active digitalis.

A warning should be sounded against the use of the tincture of strophanthus as a substitute for digitalis. The reason for this is the variability and uncertainty of its absorption from the gastro-intestinal tract. A tincture of strophanthus, used at the Massachusetts General Hospital in the ordinary doses without any untoward result or even definite physiologic effect, was tested in the laboratory by Wesselhoeft and myself on frogs by the one hour method and found to be 100 times as strong as a good digitalis tincture. That the patients not only lived but manifested no toxic symptoms is good evidence that the drug was not absorbed from the stomach or intestine. If by chance absorption of such a toxic preparation should occur, the result would be disastrous, and fatal cases are found in the literature. There is no justification for the use of a drug that usually has no action on the heart because not absorbed, and which if well absorbed, as sometimes happens, would injure or even kill the patient.

STROPHANTHIN AND OUABAIN

Strophanthin is a remedy which, if given intravenously, may save lives that would otherwise be lost. It has not received the attention it deserves, and at the present day is more often condemned as a dangerous drug than praised for its undoubted value in strengthening the heart. I have seen it restore the circulation after the pulse at the wrist could not be felt or the heart sounds heard. Many deaths have doubtless resulted from its employment in too large doses, far more I know than the published reports would indicate. Boehringer's preparation of amorphous strophanthin has been chiefly employed. The proper dose of this is 0.5 mg., and I have never heard of any death following the injection of this amount to a patient who had not received digitalis during the preceding forty-eight hours.

6. Roth, G.: Digitalis Standardization, Bull. 102, Hyg. Lab., U. S. P. H. S., Washington, 1916.
7. Balfour, G.: The Senile Heart, London, 1896, Ed. 2, p. 271. Mackenzie, James: Diseases of the Heart, London, 1913, Ed. 3, p. 378.
8. Hatcher, R., and Eggleston, C.: Jour. Pharmacol. and Exper. Therap., 1912, **4**, 113.

The fatalities that have occurred resulted from the administration of the maximum dose of 1 mg., which, when the drug was first used, was regarded as the regular dose to be employed. Fraenkel,[9] who introduced the intravenous use of amorphous strophanthin, gave 425 injections in 1913 without any injurious effect. Ouabain, or crystalline strophanthin, has not been so extensively used clinically, and the proper dosage is not yet definitely established. Ouabain obtained by Thoms' method of extraction seems to be more toxic than that prepared by the method of Arnaud. As Thoms' ouabain is twice as strong as Boehringer's amorphous strophanthin, the use of larger doses than 0.25 mg. may prove to be dangerous. Vaquez and Lutembacher[10] have given 2,000 injections of Arnaud's crystalline strophanthin in 0.5 mg. doses without any untoward action. I have obtained only benefit from strophanthin; but I never give more than 0.5 mg. of the amorphous strophanthin at a dose and have never repeated it oftener than once in twenty-four hours.

Burroughs and Wellcome supply amorphous strophanthin in tablets of 1/500 grain for intravenous use. Agassiz,[11] using this preparation, found that a dose of 1/250 grain had a definite effect in reducing the pulse rate in cases of auricular fibrillation. From a study of the literature he concluded that definite benefit from strophanthin had been obtained only in cases of heart failure associated with auricular fibrillation. Rowland, working under Mackenzie, concluded, according to a statement made in the textbook of the latter, that in cases of heart failure with regular rhythm, strophanthin intravenously had very little effect on the general condition and no effect on the pulse rate or blood pressure. I have recently used Burroughs and Wellcome's preparation, giving four tablets equal to 1/125 grain or 0.52 mg. in a single dose with benefit and without untoward results. I have obtained from strophanthin given intravenously striking benefit in some cases of heart failure with regular rhythm. As improvement has occurred in forms of heart failure that are rarely, if ever, relieved by digitalis, it suggests at least that strophanthin given intravenously exerts an effect on the contractility or tonicity of the heart muscle that is not obtained from digitalis in therapeutic doses.

I shall report one case in detail, as the evidence is most convincing as presented in the notes that the strophanthin had a prompt and definite effect in increasing the strength of the heart. The tracing of the venous pulse shows that the rhythm was normal. The pulse was not slowed by the strophanthin, but there was a definite rise in the blood pressure. The dilatation of the heart as determined by the percussion of the cardiac outline was not diminished. From these facts the conclusion seems justifiable that the benefit was due to the action of the strophanthin on the contractility of the heart muscle.

9. Fraenkel, A.: Therap. d. Gegenw., 1914, **16**, 200.
10. Vaquez, H., and Lutembacher, R.: Arch. d. mal. du coeur, 1917, **10**, 461.
11. Agassiz, C.: Heart, 1912, **3**, 353.

REPORT OF CASE

Heart failure in a case with normal rhythm; urgent dyspnea, Cheyne-Stokes breathing; chronic interstitial nephritis; great improvement following one intravenous injection of strophanthin.

History.—D. N., a man, aged 59, case 195389, Massachusetts General Hospital, Service of Dr. Edsall, when admitted, May 8, was at once placed on the danger list. There was marked Cheyne-Stokes breathing. It was thought that he was suffering from renal asthma, and hence was treated as having uremia. Treatment consisted of hot air baths, magnesium sulphate and morphin. This treatment was continued until May 13, when I was given charge of the case.

Bedside Notes.—May 13, breathing was labored, 19 a minute, typically Cheyne-Stokes in type; there were apneic periods lasting from fourteen to twenty-five seconds. The left border of the heart was in the axilla 17.5 cm. from the median line. The apex was not felt but was made out by percussion in the sixth interspace. The left border of absolute and relative cardiac dulness coincided. There was no dulness to the right of the sternum. The lower border of pulmonary resonance was in the fourth space, right nipple line. There was a systolic murmur at the apex. The rate was 76 about one hour after a hot air bath. The lower border of liver dulness was at the costal margin. The abdomen was distended, bulging in the flanks, but tympanitic throughout.

May 14, the patient had a poor night, being much disturbed by coughing. He felt very weary. He was restless and sat upright, although supplied with four pillows and a bed rest. Breathing was labored, definitely Cheyne-Stokes, apneic periods of thirty seconds being observed. The rate was 18 per minute. The sternomastoids were prominent, and contracted markedly with each inspiration. There was fulness above the inner third of the clavicles because of venous engorgement, and two waves were distinctly seen in the marked venous pulse on both sides of the neck. There was slight impairment of resonance at both bases of the lungs, more so on the left. Breathing was loud and harsh over the entire right front. At times fine sibilant râles were heard during expiration at the right base. At the left base there were fairly numerous, fine, moist râles. Early in the examination distinct bronchial respiration was noted at the left base which later became much diminished and not bronchial. Vocal fremitus was normal. A diffuse cardiac impulse could be seen 7 cm. outside the nipple line, but was not definitely palpable. The left border of absolute and relative cardiac dulness was in the midaxilla in the sixth interspace. The upper border of absolute cardiac dulness was at the third left costal cartilage. The right border of absolute and relative cardiac dulness at the fourth space was 3 cm. to the right of the midline. The lower limit of pulmonary resonance was at the fifth rib in the right nipple line. The cardiohepatic angle was acute. There was dulness over Traube's semilunar space. The heart sounds were well heard in the midaxilla and were of good quality over the entire precordium, excepting in the fourth and fifth interspace, 3 cm. to the left of the midline, where a blowing systolic murmur replaced the first sound. The aortic second and pulmonic second sounds were both possibly pathologically accentuated. The abdomen was full, rather tense and tympanitic through-

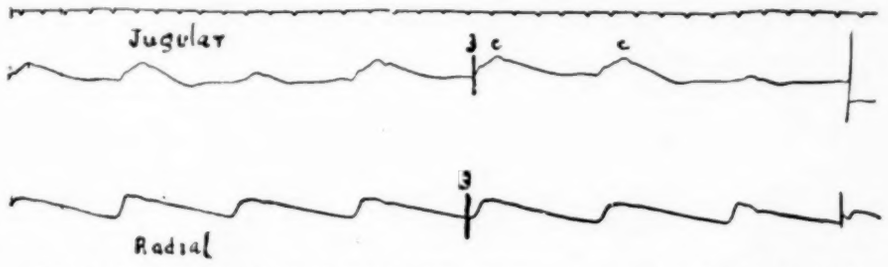

Fig. 2.—Tracing, taken March 15, the day following the intravenous injection of strophanthin. The pulse has disappeared, only the carotid wave being obtained in the neck. The radial tracing shows a regular rhythm.

out. There was slight fulness but no definite edema of ankles. There was slight hard edema over the sacral regions.

May 14, at 11:45 a. m., 0.5 mg. of strophanthin was given intravenously. The blood pressure just prior to the injection was 175 mm. of mercury; the blood pressure fifteen minutes after the administration of strophanthin was 205 mm.; ten minutes later it was 202, and the pulse 73. At 12:45, the blood pressure was 202, and the pulse 79. Within fifteen minutes after the administration of strophanthin the breathing became less labored and the Cheyne-Stokes breathing gradually became less, and at 1 p. m. it was noted that it had ceased. At this time the breathing had become abdominal in type; prior to the injection the respiratory movements were largely confined to the uppermost part of the thorax. At 1 p. m. the patient had lost his anxious expression, and the restless movements of his body had ceased. He said he felt very much better and "less tired."

May 15, when seen in the morning the patient was asleep; the respirations were quiet. There were slight movements of the lower part of the thorax, but this may have been due to the muscular twitching. Later, when a careful examination was made, the respirations were regular, and 19 to the minute. The patient was then awake. The night report stated that he had had the best night's rest since his admission. He coughed occasionally and raised some mucopurulent expectoration. His expression was placid; he dozed frequently and said that he felt perfectly comfortable. The left border of cardiac dulness was in the midaxilla, 17 cm. from the median line in the sixth space; the upper border of absolute cardiac dulness was at the fourth costal cartilage; the right base of absolute cardiac dulness was 2 cm. to the right of the median line. The lower border of pulmonary resonance was at the sixth rib, right mammillary line. The systolic blood pressure was 185 mm. of mercury and the diastolic 125 at 11:35 a. m. The venous pulse in the neck was no longer distinctly visible. In tracings made of this no *a* or *v* waves could be made out.

Fig. 3.—Tracing, taken May 22, of radial pulse showing normal rhythm.

At 11:30 a. m., while I was observing the patient, Cheyne-Stokes breathing was resumed and the patient became a little restless and the expression somewhat anxious. An intravenous injection of 0.3 mg. of strophanthin was given, and administration of digitalis begun, 0.1 gm. thrice daily. This was continued until 2 gm. were taken.

May 16, the respirations were regular, 19 per minute. The pulse was 72 and regular. The patient was comfortable except for dull pains in the legs and ankle. He was lying down low on the bed rest and took greater interest in his surroundings. The heart borders were the same. There was no edema.

May 18, the cough was much less. Respirations were quiet. There was no Cheyne-Stokes breathing. The rate was 19. There was vesicular breathing in both backs. There were numerous moist râles at the left base, but none at the right. Examination of the heart revealed a visible systolic outward thrust, 15 cm. out in the sixth space. At 11:45, Cheyne-Stokes breathing was observed with short apneic periods.

May 20, there was no cough. The pulse was 68.

May 21, tracing showed an occasional extrasystole not felt in the radial pulse; but a long pause was noted at the wrist.

May 22, the pulse was 68. The respirations were 20. There were no dropped beats.

May 25, there was one dropped beat in a minute. The apex impulse was high and quite forcible in the sixth interspace, 14 cm. out. The left border of relative cardiac dulness was 16.5 cm.; the left border of absolute dulness, 13.5; right, 2 cm. There was a distinct venous pulse. Examination of the lungs revealed no dulness or râles.

May 26, the pulse was 70. The patient was now comfortable.

May 31, he was up for half an hour with no bad effects.

June 9, he was up two hours.

June 13, the patient was discharged.

In this case of heart failure with normal rhythm, as shown by the polygraph tracings, severe dyspnea, which had been present continuously since the patient's admission to the hospital—a period of eight days—was lessened within fifteen minutes after the intravenous injection of 0.5 mg. of strophanthin, and within one hour and fifteen minutes the marked Cheyne-Stokes breathing entirely disappeared. The blood pressure was raised 30 mm. of mercury in the fifteen minutes following the injection.

SUMMARY

Much of the digitalis now being used in the country is of poor quality.

Active leaf grows in various parts of the United States from Maine to the Pacific coast.

Digitalis from the same locality may vary greatly in strength from year to year.

To obtain the full therapeutic effect, the drug should be pushed until it acts on the stomach, the bowels or the pulse, and should then be discontinued for a few days at least.

Amorphous strophanthin given intravenously may exert a direct and beneficial action on the heart muscle that has not been observed when digitalis was given to patients.

ABSTRACT OF DISCUSSION

SIR JAMES MACKENZIE, London, England: I can support Dr. Pratt in nearly everything he says, but I have never found an inefficient sample in England. There is another point: I am doing a little bit of propaganda work. Many years ago it used to grieve me to see men go from me to Germany and come back with a blood pressure instrument and think they were heart specialists. For some years the English system gradually fell into disuse and everybody went off to worship false gods. The physician, instead of being a superman and saying what he will do to the surgeon, is inferior to them all. The physician is subject now to the surgeon and to the pathologist who is making a vaccine. John Hunter was an ordinary physician, but he was the greatest surgeon of the day, the greatest physician of the day and the greatest pathologist of the day, and if you will read about him you will find he knew more about medicine than anybody. He was the man who described gallstone colic and he was the first to describe Cheyne-Stokes breathing. He was a careful observer, following the English system of observation. Professor Cushny first told me about Withering. I had analyzed the cases that I had treated with digitalis, and then I read Withering's book, and I found that Withering had anticipated me. His observations about auricular fibrillation were put in a better paper than all the pharmacologists and physiologists in the world have ever written. I want you to think of that and what that means.

Fly Poison.—Phelps and Stevenson, of the United States Public Health Service, recommend an aqueous solution of sodium salicylate sweetened with brown sugar as fly poison. Three teasponfuls of this powder in a pint of water is the proper dilution. This fly poison has the distinct advantage of being nonpoisonous to children, while equally as effective as the more poisonous substances employed.

INTESTINAL PARASITES IN CHILDREN*

H. M. McCLANAHAN, M.D.
OMAHA

Every animal, including man, is an unwilling host to one or more kinds of parasites. A number of these produce serious diseases. At the present time, more than 300 kinds of animal parasites have been described for man, and the list is constantly growing. By the term parasite is understood a living organism, which, for the purpose of obtaining food, takes its abode temporarily or permanently on or within other living organisms.

There are two great general divisions, vegetable, or phytoparasites, and animal, or zooparasites. While the phytoparasites offer a rich field for research and cause many serious diseases, they will not be considered in this paper. The zooparasites invade every organ, tissue and fluid of the human body. Their significance as an etiologic factor in disease is becoming more appreciated and understood.

There are ectoparasites, which live on external surfaces of the body or in cavities easily accessible from the exterior. This class will not be discussed in this paper. Endoparasites are those that live in the interior cavities, or fluids, or tissues of the body. Parasites are temporary, as in the case of fleas and bedbugs, and permanent, as in the case of many classes of helminths. Some parasites are confined to certain hosts, and are called specific parasites, as the beef tapeworm, which is specific for man alone. Other parasites thrive equally well in several hosts. These are called cosmopolitan, such as the *Dipylidium caninum,* a tapeworm found in the dog, the cat, and man. There are examples of free living animals which become parasitic when introduced into the body, as the vinegar eel. These are called facultative parasites.

CLASSIFICATION OF ANIMAL PARASITES

The foregoing gives a general survey, but is not scientific. With the morphologic characters used in classifying free living animals, as a basis of classification, animal parasites in man occur in four of the great primary phyla of animals.

First come the protozoa, or one-celled animals, four classes of which include parasites pathogenic to man, such as the endameba of dysentery, the treponema and the *Balantidium coli.* Second, come the arthropoda, including five classes, two containing parasites of man, and all containing many orders, including the cereal mites, mountain ticks, lice, etc.

Third, come the platyhelminths, or the flat worms, and fourth, the nematelminths, comprising the large group of round worms. Only certain classes of the last two phyla will be considered in this paper. The platyhelminth group is subdivided into three classes. The first class, *Turbellaria,* is rarely found in man. The second class, the trematodes, includes the flat, unsegmented worms, with one or more suckers, popularly known as flukes. It also includes a large number of parasites pathologic to man, but is beyond the scope of this paper. The third class, the cestodes, includes the girdle form flat segmented worms, or tapeworms. Up to the present, thirty varieties of tapeworm have been described. Of these, the following are the important parasites in man: The beef tapeworm, or *Taenia saginata;* the pork tapeworm, or *Taenia solium;* the fish tapeworm, or the *Dibothriocephalus latus.* The dog or cat tapeworm, the *Dipylidium caninum,* is probably the most frequent in infants. The larval stage is passed in the flea, which lives on the skin of the animal, and in turn is swallowed by its host. The *Hymenolepis nana* and the *Hymenolepis diminuta* are small cestodes from one fifth of an inch to one inch in length, whose life history is not yet complete. By some, they are thought to be identical with the cestode of the rat, and conveyed by that rodent to man.

There is a somatic group of cestodes which exist in a larval form, the most common being the echinococcus, causing hydatid cysts, etc.

The fourth phylum, the nematelminths, comprise the largest group of intestinal worms. This series is divided into three classes: First, *Acanthocephalia,* or the thorny headed worms, very rare in the human family; second, the *Gordiacea,* or hair-snakes, living in water, also rare in man.

The third class, the nematodes, contains the largest number of important parasites in man: First, the pigworm, or roundworm, the *Ascaris lumbricoides;* second, the pinworm, threadworm or seatworm, the *Oxyuris vermicularis,* the most frequent in infants; third, the hookworm, a group known by various names, such as the *Necator americanus, Ancylostoma duodenale,* the *Strongyloides intestinalis,* the *Strongyloides stercoralis,* and the *Uncinarias;* fourth, the *Trichuris trichiura,* or the whipworm, quite common and least harmful in children. Two other classes not included in this paper are the *Trichinella spiralis* and the *Filariae.*

CONCLUSIONS OF OTHER WRITERS

The foregoing arrangement is abstracted from a general classification arranged for me by Dr. F. B. Barker, professor of parasitology, University of Nebraska. In my examination of standard textbooks on parasitology, this classification appealed to me as more practical and easier to comprehend. Much valuable literature on this subject has appeared in recent years, some of a purely scientific nature, concerning the life history of helminths, and their geographic distribution.

Prof. Henry B. Ward,[1] of the University of Illinois, has called attention to the fact that the recent textbooks fail to convey the proper ideas concerning the tapeworm class, and that the tapeworms of the beef, pork and fish are rare in infancy, but the tapeworm of the dog and rat is more common. I quote from his article as follows:

> Of 100 cases of the dog tapeworm on record, 34 per cent. of cases in sucklings of 1 to 6 months; 42 per cent. in infants 7 months to 3 years; 10 per cent. 4 to 8 years, and only 13.5 per cent. above 8 years.

As a further evidence of the frequency of parasites in children, I call attention to an article by Oscar M. Schloss.[2] I abstract as follows:

> These investigations were conducted upon 310 children of from 2 to 12 years old, for the purpose of determining, first, the frequency with which children of this age harbor intestinal worms; second, the species of parasite harbored, and the relative frequency of occurrence; third, the number of cases

* Read before the Section on Diseases of Children at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Ward, H. B.: Arch. Pediat., 1916, **33,** 116-123.
2. Schloss, O. M.: Am. Jour. Med. Sc., 1910, **139,** 675-705.

in which intestinal worms are responsible for symptoms, and the nature of the symptoms produced; fourth, the occurrence and significance of eosinophilia in infections with intestinal worms.

He gives the following summary and conclusions on his work in New York: First, twelve of thirty children who suffered from unexplained nervous and gastro-intestinal symptoms were found to harbor intestinal worms. Second, consecutive examinations of 280 children showed that eighty, or 28.5 per cent., harbored intestinal worms. Five of the children harbored two species of parasites, giving a total of eighty-five infections. Third, thirty-one, or 11 per cent., harbored *Trichuris trichiura;* twenty-three, or 8.25 per cent., *Oxyuris vermicularis;* twenty, or 7 per cent., *Hymenolepis nana,* and five, or 1.75 per cent., *Taenia saginata.* Fourth, only one of thirty-three children infected with *Trichuris trichiura* suffered from the symptoms, while thirty-five out of the fifty-one infected with other parasites suffered from the symptoms. Fifth, eosinophils were not increased in *Trichuris trichiura* infections and were usually absent in infection with other parasites, when there were no symptoms of helminthiasis, but were usually present when such symptoms were present.

The writer's conclusions were as follows: First, intestinal parasites are not infrequent among children of the poorer classes of New York City. Second, intestinal parasites may be harbored without inconvenience to the host, and on the other hand symptoms may occur which are always deleterious and sometimes severe.

SYMPTOMATOLOGY

As is well known, all manner of symptoms are attributed to intestinal worms. In the south and other countries where the hookworm prevails, the symptoms are quite characteristic. We have seen but one case in Omaha, in a child who had spent the summer in Florida. The beef, pork and fish tapeworms have no characteristic symptoms. In my experience they are usually detected by observation of the segments of the stools. Among the recent articles on fish tapeworm, mention is made of the fact that the patients have a peculiar weakness out of proportion to the symptoms, and generally a high eosinophilia. It is believed by some authorities that this parasite elaborates a toxin. The larger roundworms may cause symptoms, the two chief ones being abdominal pain and mucus in the stool, also their migration. Twice in my personal experience patients have vomited roundworms. Twelve cases of obstruction of the bowels by masses of roundworms are reported. Threadworms are more frequent in infants, and while they may infest the upper bowel, they are usually present in the lower bowel. The most characteristic symptom is itching, with pruritus ani. The worms may often be discovered by careful inspection. Four times in the last year, I have been able to diagnose this type by inspection. The real proof of the presence of worms is the discovery of the ova in the stool. In his work on "Faeces in Children and Adults," Cammidge calls attention to errors that may occur in stool examination, and shows that even good observers may be mistaken. Muscular fibers, the parenchyma of fruit, the cuticle of seed, elastic tissue, banana fiber and mucus have all been mistaken for worms or ova. Quite frequently, children will pass worms during acute sickness. I have noted this in cases of cerebrospinal meningitis, in typhoid fever, in pneumonia and in enterocolitis. In one case of a child whom I was treating for mucus diarrhea, he passed at one time three roundworms and after that promptly recovered. Aside from the symptoms, intestinal worms may do damage by their migration, by the production of leukomains, as has been recently pointed out, by the decomposition of dead worms in the intestinal tract, and by the mechanical irritation of the lumen of the bowel, causing excessive secretion of mucus and interference with absorption. The hookworm living off the blood of the host causes a severe anemia, either by abstracting the host's blood or by developing toxins.

THE THERAPEUTIC TEST

I wish now to call attention to what I may term the therapeutic test. It is my impression that physicians as a class minimize the importance of intestinal helminths. As we all know, the lay public attribute all manner of symptoms to intestinal parasites. We so often hear the question, "Does this child have worms?" that we are in danger of overlooking them when they are actually present. For several years, I have made it a rule, in selected cases, to apply the therapeutic test, with the consent and cooperation of the mother. I have followed a routine procedure as follows: The child is given a cathartic in the evening, a light supper and no breakfast; and in the morning, the treatment is instituted. I have employed a combination of santonin and calomel, or the fluid extract of spigelia and senna. I am in the habit of combining this remedy with the syrup of blackberry. These remedies are followed by a brisk cathartic of either castor oil or solution of magnesium citrate. The mother is instructed to have a vessel containing water ready, and the stools are carefully examined. Any suspicious particles are put in a bottle and brought to me for inspection. Very frequently, I find strings of mucus, or banana fiber, which the mother feels very certain is a parasite. Also vegetable fibers are obtained, and particles of meat that require careful inspection. I have notes on the cases of fifty-seven children ranging in age from 4 to 12 years, in which this routine treatment was employed. As a result, three of the patients passed roundworms, one passed some segments of a taenia, and two passed threadworms, making a total of six, or a little more than 10 per cent. of the number. These were all run-about children having minor ailments and in none was there any positive evidence of worms.

In my experience, the threadworm is the most frequent in infants from 1 to 3 years old. All infants suffering from pruritus ani should be carefully inspected. These patients are very difficult to cure. In one of my cases, persistent treatment was continued for eight months. It is an error to depend entirely on local treatment. It is now known that these parasites may infest the bowels so high up as not to be reached by an enema. The treatment I employ is as follows: Once a month, the infant is given small doses of calomel and santonin, usually four doses one hour apart, and followed in an hour by a cathartic. In seven cases, large numbers of worms were expelled. Each night the mother applies a salve composed of mercurial ointment, 2 drams, and benzoinated lard, 2 drams. She is instructed carefully to separate the folds when applying this salve. Following a suggestion made by Holt in his textbook, I have used an

infusion of garlic, for which two bulbs are sliced and boiled in a pint of water and strained. This treatment is kept up for a week and then, after an interval of three weeks, is resumed again. In four cases, two series of treatments have resulted in a complete eradication of the parasite. I have had one case of the dog tapeworm in a child aged 16 months. This child had as constant companion a pet dog. The youngest patient having a beef or pork tapeworm was 16 months old. This infant had been fed for a long time on raw scraped beef. I have had many failures in the treatment of the tapeworm because of the inability of the child to retain the remedy. In one case in which I had two such failures, at the third treatment I introduced the remedy through a catheter into the stomach. This treatment was successful in expelling the head.

It has been my experience for many years that when the head is not expelled, an interval of about three months elapses before segments appear in the stool. Treatments should not be repeated until segments do appear. I have employed either the ethereal extract of male fern or of pelletierin tannate.

Roundworms in children, which often cause no symptoms, are, no doubt, the most frequent variety of parasites. They may be conveyed to the child in uncooked fruit, in vegetables and in drinking water, and the ova may be carried by the common house fly. My treatment for this variety of worm is the combination of santonin and calomel as in the treatment of pinworms. Twice in my experience, a repetition of the treatment resulted in the expulsion of worms a second time from the same host. Hence, when roundworms are discovered, I advise a repetition of the treatment.

COMMENT

An inquiry among the druggists of Omaha elicited the fact that worm medicine commanded a large sale, some saying as large a sale as cough syrups. All anthelmintics are poisons. Bastedo states that three grains of santonin have proved fatal to a child. I have had three serious cases of poisoning in children from the use of worm medicines. Would it not be wise for physicians to warn parents of this danger? Only recently THE JOURNAL has called attention to one of the patent worm medicines containing santonin.

Intestinal parasites may be the cause of obscure symptoms in children not explained by careful clinical examination.

ABSTRACT OF DISCUSSION

DR. WILLIAM WESTON, Columbia, S. C.: In 1902 we endeavored to eradicate uncinariasis in a community of about 8,000 population, and among that number we treated 1,600 cases of uncinariasis. Uncinariasis is an importation from the west coast of Africa. Our findings differed materially from the findings of English physicians who had worked with this disease in Egypt. We had a high birth rate among the population affected and a comparatively low death rate, but their efficiency was markedly affected. The ease with which the parasites may be eradicated is another point of great interest and importance. We tried all kinds of drugs, and we found oil of chenopodium was the best remedy. Another point, we seldom found a case that was not complicated with other intestinal parasites, and the use of oil of chenopodium was equally effective in the elimination of these other intestinal parasites as with the uncinaria.

DR. LANGLEY PORTER, San Francisco: The older clinicians were very insistent on the fact that one could not get rid of the ordinary thread worm unless the child was protected from reinfection. The child scratches, the eggs get under the finger nails, and so reinfection constantly takes place. Most old textbooks recommend that the fingers be protected during the period of infection. A good protector is flexible collodion. Dr. McClanahan's suggestion about a stomach tube sounds like good advice. Years ago I was unsuccessful in securing the head in a case of tapeworm, and the father took the child to a charlatan tapeworm specialist—a layman. This man used ordinary male fern extract and divided the dose, administering it by capsule. The child was wrapped up and one of the capsules was tossed back behind the tongue into the pharynx. It seems to me this method may be less disturbing than the stomach tube. Another point about tapeworm, and that is the passage of the worm. The loss of the head comes from mechanical fracture, and if the child is placed on a vessel filled with water, at body temperature, the weight of the worm is supported, and there is no contraction of the worm due to change of temperature, and so, if these precautions be taken, the head is more frequently obtained than otherwise.

DR. C. F. WAHRER, Fort Madison, Iowa: When I was a young boy on the farm our drinking water was contaminated with many things that should never get into a baby's stomach, and old granny was right possibly half the time when the child looked pale around the mouth and crunched its teeth and was nervous, in saying that the child had worms, and she thought there was nothing so good as to give two or three teaspoonfuls of turpentine. Dr. McClanahan's paper is very timely, especially when he warns parents not to dope children with all kinds of worm medicine, especially turpentine. This is sometimes dangerous. Not long ago I was called to see a child 4 years old. The mother had given four teaspoonfuls of turpentine for worms. The child was suffering with a severe case of strangury, and was dead in twenty-four hours. Not long ago a woman came to me with a child about 7 months of age, and showed me a stool just full of what looked like worms. I made a slide and found it was banana threads. She had already given turpentine three times and was also giving some vermifuge in heroic doses. She had given the baby three or four bananas in one day. It is wonderful how children can survive.

I would suggest that in these days of better water supply we make our diagnosis of worms in children tentative until it can be verified before using worm therapeusis.

DR. ALBERT H. BYFIELD, Iowa City, Iowa: About a year ago a child of 2 years came to our clinic with intestinal parasites and a violent pyelocystitis. All of the classical remedies were used without avail. The patient presented a history of harboring not only the fine pinworm, but also the ascaris. Feeling that intestinal irritation was possibly keeping the pyelitis alive, I proceeded vigorously in an endeavor to rid the child of worms. After about eight weeks the pus diminished in quantity, the urine became quite clean and, although I kept in touch with that patient for over a year, there has not been the slightest return of the trouble.

DR. HARRY M. MCCLANAHAN, Omaha: There was one point I left out in reading, that is, that we so frequently discover intestinal parasites during acute infections. As to hookworm, of course, I merely mentioned it, as we do not have hookworm in our part of the country. I appreciate what was said about oil of chenopodium. As to the question of reinfection by scratching, that point is well taken. A word of warning as to the use of mercuric salve: While it is valuable in the treatment of this condition, there is the danger of ptyalism, and we should be on the lookout for it.

Old Time Specialists.—It appears from the writings of Herodotus that the physicians of Egypt were considered the most learned in the world, and that they practiced specialties, being divided into oculists, dentists, surgeons, accoucheurs (mostly women, but also men), etc. From the researches of Ebers we learn that the physicians wrote prescriptions which were compounded by a special class of medical men who were practically apothecaries or dispensing pharmacists, and Rawlinson says that all physicians were separate, as a class, from the priests.—Wall, *The Prescription.*

THE ETIOLOGY AND TREATMENT OF ENURESIS *

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About 200 cases of bedwetting were studied for a period of more than seven months. Most of the patients of less than 4 years of age and a few older ones were not used because they were not sufficiently developed mentally to be willing to undergo privations as an end to their cure. Children more than 12 years old were not seen. The treatment was not outlined to patients not living with their parents, who would not make the necessary sacrifices, nor to patients brought in by neighbors. Children with cord lesions or other organic nervous diseases, diabetics, and those with marked mental disorders were considered as outside the scope of this study.

Boys comprised 62 per cent. of the cases. Blond children predominated. There was a history of enuresis in the immediate family in 56 per cent., including grandparents, aunts and uncles.

In 59 per cent. of the cases, the wetting took place only at night, and 38 per cent. wet both day and night. Less than 3 per cent. were day wetters exclusively. Incontinence of feces was encountered twice. In 68 per cent. the wetting occurred every night. The remainder wet less frequently. Seventy-nine per cent. had always wet the bed from babyhood; 20 per cent. began later in life after a normal period. Of the latter, four started with scarlet fever, one with chorea, and one after a fall from a window.

CONDITIONS ACCOMPANYING ENURESIS

The etiology, as usually considered, varies from malnutrition to a concentrated urine and even adenoids. As to adenoids, 36 per cent. of my patients had had them removed without apparent relief. In two cases the wetting was definitely worse after the operation. Fifty-one per cent. of the boys had previously been circumcised, and were, nevertheless, bed-wetters. Only three boys and one girl had adhesions of the prepuce. The adhesions were not broken up, and the cases in question numbered among the easily relieved in spite of the adhesions. Acidity, alkalinity, and high or low specific gravity of the urine were all held as of little consequence, and were never allowed to influence the treatment. Pus in the urine was always considered an evidence of inflammation, often very mild, and was cleared up before the enuresis treatment was instituted.

There was a definite history of pinworms in 20 per cent. of the cases. Besides these, there was a definite history of pinworms in either a parent or brother or sister in 32 per cent. I believe a much higher percentage among the enuresis patients would be found to have worms, had they all been given an appropriate treatment to bring the worms to light. Whether the incidence of pinworms in cases of enuresis is of greater proportion than in the ordinary run of cases, I am not prepared to say, but I am of the opinion that the proportion is greater, and that the pinworms may often be of at least secondary importance in the etiology of enuresis. The worms were prevented from accumulating by the giving of calomel and santonin.

There were many accompanying conditions present, among the more frequent being pinworms in thirty-four cases, pyelitis in eleven, tuberculosis in five, chorea in four, orthostatic albuminuria in four, adherent prepuce in four, and thirteen other conditions, such as one would expect to meet in any clinic. Only two patients were feebleminded, and four had some external genital abnormality. Most of the patients in the series were underweight, only one being definitely overweight.

About half the patients in this series had been previously treated by various other methods, many having been tried along two, three and even four lines. Twenty-six had been circumcised without any benefit, two becoming a trifle worse. Forty-nine had had their tonsils or adenoids or both removed to improve their condition. Twenty-four had had a more or less thorough "atropin treatment." Sixteen had received some form of alkali for an acid urine.

ETIOLOGY

Enuresis is probably never a disease entity, but simply a symptom or evidence of an underlying cause, namely a neuromuscular fatigue. This fatigue is not localized to the genito-urinary nerves and muscles, but is general. It is not an acute fatigue or exhaustion, but a chronic one. Enuresis patients are alike in many manifestations. They are all exceedingly active and nervous. When night comes, they are dead tired and sleep so soundly that it is almost impossible to wake them. Some slept so profoundly that it was impossible at 10 p. m. to awake them sufficiently to urinate, and when they were put back to bed they wet within five minutes. The children were never thoroughly rested because their period of sleep was never long enough to overcome the fatigue and strain of the long, active day. I believe it is due to such a neuromuscular fatigue that some children stutter and others have habit spasms. In bedwetting, control is lost over a certain group of muscles, but the general fatigue and loss of tone is behind it all.

Mental strain is often also a factor. Many of my patients attended parochial school that required almost seven consecutive hours of work. Then they were required to spend two or three hours doing home lessons at night. Such mental strain creates fatigue. If there is enuresis in such a child, it usually cannot be controlled until school is abandoned for a while and the general body tone revived.

Diet is an equally important factor in producing the general fatigue. The diet in over 95 per cent. of my cases was very poor. The patients were getting plenty of food, but not of the right kind or at the right time. More than half were getting baked beans for two meals in the week. Candy, cake, ice cream, syrup, molasses, cocoa, coffee, tea, apples, bananas, frankforts and pickled herring were daily offenders. Indigestion was uncommon, but such articles of diet and the food eaten between meals kept the gastro-intestinal system under a constant strain, and added appreciably to the general body fatigue. Adenoids, adherent prepuce, highly acid urine and irritation from worms may also add their mite to the creation of a general fatigue. As heredity plays an important part, the fatigue may be easily explained as a congenital lack of general systemic tone.

* From the Medical Outpatient Department of the Children's Hospital.
* Read before the Section on Diseases of Children at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

Not only is there an underlying cause in enuresis, namely, general neuromuscular fatigue, but there is another and most important factor—habit. After the underlying cause has been removed, the habit of bedwetting may still remain. The treatment for the habit is very different from the treatment for the underlying cause, and is often more difficult to overcome. Many of the patients, when they present themselves for treatment, have only the habit remaining. Regularity in urination may in itself cure many of these. I imagine it is in this sort of case that suggestion, electricity, spinal douches, and surgical methods usually meet with good results in many hands.

May I compare the cause and habit in enuresis to the cause and habit in whooping cough and also in chorea? After the infection in whooping cough has long passed, the characteristic spasmodic cough often persists for months. It is simply an uncontrollable muscular habit, due to a cause no longer present. After the infection in chorea has passed, there persists again an incontrollable habit, dependent on, but entirely different from the original cause, namely, the infection.

The size of the bladder must also be considered. When enuresis has continued from babyhood, the bladder, continually emptying itself, is probably never distended to more than a capacity of from one to three ounces. This physical condition must be treated by gradually lengthening the periods between urinations.

TREATMENT

The treatment for enuresis in this series was planned absolutely along dietary and hygienic lines, with emphasis laid especially on more sleep and rest hours. No drugs, operations or mechanical means were employed. Printed directions were supplied to each mother and every minute detail explained.

All food was forbidden between meals, even milk and bread and butter. The diet list included milk, butter, eggs, meat, fish, breadstuffs, cooked cereals, macaroni, vegetables, orange, stewed fruits and simple, unsweetened desserts. It excluded soups, coffee, tea, cocoa, sweet and salty and highly seasoned food, ice cream, candy, pastry, cake, jellies, jams, etc., condiments, bananas and raw apples. Meat, eggs and vegetables were forbidden for supper, simply to make it easy for the digestive system at night.

The child was required to be in bed by 7 p. m. If it was a very nervous child, school was prohibited temporarily, and a nap required at noon. No play was allowed after 4 p. m. The child was to be entertained by books or toys in a chair. Moving picture shows, music lessons and evening home lessons were prohibited.

The habit element was treated in the usual way. No fluids were allowed after 4 p. m. There were regular hours for urination at night, namely, 7 p. m. on going to bed, 10 p. m., and not again until 6 a. m. Many children could not go eight hours because their bladders could not distend to hold more than two or three ounces. These were made to urinate also at 2 a. m. After a few weeks, the 2 a. m. urination was omitted. Punctuality was considered of prime importance; 7 p. m. meant 7 p. m., not 7:05 p. m. A regular habit for the time of urination means a great deal.

The day wetters were made to urinate at regular, stated times, anywhere from every three hours during the day down to every twenty minutes. The interval was gradually lengthened until a satisfactory regimen was reached.

It takes courage on the mother's part to carry out every detail of the treatment, because, unless the child is anxious to overcome his condition, she will have to watch him every minute in order that he does not eat between meals or take forbidden food, and to see that after 4 p. m. he is quiet and drinks nothing. For this reason, the older the child, the more successful the treatment. At the first visit, much time was spent in explaining the details to the mother, and the reasons for them. At each subsequent visit the details were investigated by cross-examination, and the faults corrected. Rewards were offered, not for not wetting the bed, because the children do not know when they do that, but for following directions and refraining from the temptation of food and drink.

Nineteen per cent. of 131 cases did not wet the bed on any occasion after their first visit for instruction. Another 23 per cent. did not wet once after the first few weeks or months, not wetting for at least one month previous to May 1. An additional 31 per cent. were relieved to the extent that they never wet more than once a week. Thirteen and one half per cent. were partially relieved. Sixteen patients, or 12 per cent., were not relieved at all. When a combination of day and night wetting existed, the day wetting usually stopped first. This was because the child could purposely wait until the appointed time for urination. Both cases of incontinence of feces cleared up in less than a month.

After the child has been successfully wakened at 10 p. m. and 6 a. m. without wetting the bed for a few weeks, he usually wakes himself at those hours, but he should not be trusted to awake himself for fear of his oversleeping and thus breaking the "dry habit." This makes it easier to wet the next time. It may take many months of treatment to tone the body to such a degree that the enuresis habit will never recur under any conditions. After an apparent cure, an intercurrent cold or an upsetting of digestion will cause the bedwetting to begin again. This is probably due to a return of the general fatigue resulting from the infection or other disturbance.

In the treatment of enuresis, many of the other coexisting disorders were markedly improved. A habit spasm in one case and night terrors in two cases soon disappeared. Stuttering in another was greatly relieved. Attacks of petit mal were reduced 75 per cent. in one boy. The usual nervousness and irritability decreased so much that almost every parent remarked it without a hint. Almost every child gained weight. There was very often an initial loss of weight due to the fact that on the simple diet many of the children would not eat the plain food.

Many writers have described subacute inflammations of the urinary tract as either causes or accompanying conditions in many enuresis cases. It is a matter of common knowledge that mild cystitis and pyelitis are usually secondary conditions, flaring up when the patient is run down or diseased. It may be that the general body fatigue is responsible for the continuance of both the inflammation and the enuresis. On the same theory, atropin, strychnin and thyroid may act as a nerve or muscle tonic. It is usually conceded that the drugs have little effect unless used in conjunction with some hygienic treatment.

As this work was done on outpatients by themselves in their own homes, a perfect result could not reasonably be expected. The nature of the directions are such that the mother may repeat the whole treatment, after

a discouragement, without consulting the physician. The purpose of this paper is to show the effect of a simple, regular diet and plenty of rest and little excitement on the underlying cause of enuresis, which is general neuromuscular fatigue. The wetting habit is secondary, and must be treated by limiting fluids and establishing regular hours for micturition.

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ABSTRACT OF DISCUSSION

Dr. Harry Lowenburg, Philadelphia: I have never felt that I cured a case of enuresis. I have had them get well, but I have always thought I had little to do with it. I remember one family in which there were three children with this condition. The father paid me quite a fee for trying to cure this condition, and I have felt conscience stricken ever since. The children eventually got well, but I do not believe I had anything to do with it. The doctor said he found underlying nervous fatigue. I believe that is true. The treatment for this is difficult, because we cannot remove the children from their own homes. To illustrate: A child was brought to me about four weeks ago. The mother said she could do nothing with the child; that it sat around all day and cried. The child cried in my office, and the mother said, "You stop crying; the doctor has a policeman in the house." I promptly told the mother she ought to commit suicide, that there was nothing I could do for the child unless the cause was removed. It is difficult to treat these cases from the fact that almost all of these parents are neurotic. The next case I get I am going to send to Boston to Dr. Grover.

Dr. H. M. McClanahan, Omaha: I have been disappointed often when children have been operated on for circumcision, without any result so far as the enuresis was concerned. I appreciate what Dr. Grover said in regard to diet. In children 8 to 12 years of age, the bladder is too small and will not hold a sufficient amount of urine to carry the child over the night. With the cooperation of the roentgenologist, we have some data along this line. We must get the confidence of the child and persuade it to hold the urine as long as possible during the day so as to develop the bladder. This can be done. Boys may be instructed to stop the act of urinating several times in order to develop certain muscles. Another point is to have the patient make certain to empty the bladder. Older children should be instructed to drink very little fluid, say, after 5 o'clock.

Dr. M. L. Turner, Des Moines, Iowa: My experience has been somewhat different from Dr. Grover's. I read some place that enuresis was due to a lack of development of the nerve center that controls the bladder, and I have worked on that theory. Take a child 8, 10 or 12 years of age, and make an impression on it in some way and it will stop bed-wetting within twenty-four hours. I have had a number of cases of that type. I think I can say that I have cured these patients—or at any rate the enuresis has stopped—in 75 per cent. of the cases. One of the first things I do is to stop the drinking of fluid after 4 o'clock in the day, and have the mother impress on the child that it is keeping the fluid from the child to keep it from bed-wetting. Where the mother will cooperate we usually get good results. I have used medicine in some cases at 4, 6 and 8 in the evening—usually tincture of nux vomica—and tell the mother to impress on the child that he is taking it to keep from wetting the bed. When the child has been impressed with this fact he ceases to wet the bed. One little girl came to the dispensary for treatment. The mother said the child would wet the bed within half an hour after going to bed, evidencing the fact that the center loses control before the bladder is full. I said to this girl, "You will soon be a young lady, and will want to have gentlemen call on you. Is your mother going to have to tell you that you cannot have callers because you wet the bed?" She went home and never wet the bed again. In another case the child was told she would have to have an operation if she did not stop wetting the bed. She went home and never wet the bed again.

Dr. Franklin N. Rogers, Manchester, N. H.: I am disappointed that there is not something more than the rule of rest that can be laid down for these little patients suffering with enuresis. It is discouraging not to be able to give these patients immediate relief. The point which impressed me most in Dr. Grover's paper is his emphasis on rest in the treatment of this condition. We all know rest is essential to children. The daylight saving plan which is now in operation has, without doubt, shortened the period of rest for children. It is hard to get a child to go to bed at the usual hour because it is so light. I agree also that there is a great deal of nervous irritability in these children—often due to family living conditions. A great deal can be done by the family for a child suffering with enuresis by enforcing the rules laid down by the doctor.

Dr. Joseph I. Grover, Boston: About a week before I left Boston I saw a boy, 11 years old, who wet the bed several times every night, and had done it ever since he was born. I explained everything to the boy in this case—he was educated and old enough to understand. Every day for the next eight days he was dry for the first time in his life. He passed his water at 10 o'clock at night and not again until 6 in the morning. In treating children by diet and rest, the child's general condition becomes improved. It seems that by treating enuresis children in general, with a good diet and rest, you can kill two birds with one stone.

THE EFFECTS OF HIGH EXPLOSIVES ON THE EAR*

J. GORDON WILSON, M.B.
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The large number of men incapacitated for military service on account of deafness due to the concussion from high explosive shells is engaging the attention of military authorities in all the armies in this war. The number of men who will return to civil life with seriously impaired hearing demands the attention of otologists. I have chosen this subject for consideration, not only because it is urgent, but also because I have had considerable opportunity to observe such results in warfare and in addition have studied in a very modified degree corresponding effects in the laboratory. It shall be my endeavor to describe my observations and the results of my investigations rather than to attempt to offer any explanation or form any hypothesis.

The otologic cases resulting from the bursting of a shell are divided into two groups:

1. Those in which a piece of the shell has struck the ear. The trauma may have been limited to the external canal or to the mastoid, or may have involved the middle and internal ear. Injuries to the external canal or mastoid cause total or partial deafness on that side and at the same time some loss of hearing at least temporarily in the other ear. In addition, we have the results of the suppuration and contractures of the external meatus so apt to follow. Injuries involving the middle and internal ear are usually immediately fatal from associated injury to the brain, and those who survive are totally deaf in that ear.

2. Those in which the damage has come from the explosion without any fragment of the shell striking the ear or its immediate neighborhood. In some there has been no objective signs of any trauma, in others some fragments may have caused a trauma in a part remote from the temporal bone. It is with this second division that this paper is concerned. It includes a large number of cases in which the diagnosis is fre-

* Read before the Section on Laryngology, Otology and Rhinology at the Sixty-Ninth Session of the American Medical Association, Chicago, June, 1918.

quently very difficult and the treatment as yet unsettled and obscure.

It has long been known that cases of temporary deafness occur during big gun fire. In these cases, tympanic ruptures are rare. The artillery men and navy gunners are able to take precautions such as standing back of the gun, plugging the ears with the fingers or cotton, and opening the mouth, when the guns are fired.

PREVALENCE OF WAR DEAFNESS

In previous wars, serious concussion deafness was extremely rare. In the present conflict which is preeminently the war of trenches and high explosives, cases of concussion deafness are numbered by the thousands. Many thousands of shells of high explosive force are in each engagement sent over to blow up the trenches and prepare the way for the attack. These shells vary in weight from a few pounds to about a ton and each consists of a thick iron case with a central cavity containing the charge which may be as much as 200 pounds of high explosives. These shells do not contain bullets. The injury comes from the explosive force, from the fragments of the shells and from debris from adjoining structures which they have shattered. The concussion effects are no longer confined to the artillery men who fire the big guns; far greater and more numerous are the disastrous effects produced by the burst on all classes of combatants.

The effect of the high explosive is a great compression followed by a great decompression; it is probable that the damage done to the ear results from the compression. I have had men under my care who have been blown considerable distances; thus, one man was blown out of the trench and then became unconscious. Another was blown 6 yards, became dazed and finally lost consciousness for three days.

I know of no available figures that can help us to form even an approximate estimate of the numbers injured in hearing either temporarily or permanently by shell explosions. Whatever figures I give in this paper are to be understood as of only relative value. When in France, the fronts I was stationed at were relatively quiet and cases arising from exposure to heavy bombardment were rare, so my figures only show what may be expected in times of quietness. The base hospital, at which I was stationed and which was equipped for eye and ear cases, had sent to it either for examination and report or for admission and treatment many patients with deafness of long duration, but only such as had no need for general surgical or medical care. So obviously such figures would be misleading.

Dr. Sohier Bryant[1] of Boston has recently published a statement in regard to the number of men incapacitated from injuries and diseases of the ear in the French armies based not only on observations made by himself and his colleagues in the French army, but on figures given by the French war office.

"In the zone des Armées at the Front, the total sick contains 16 per cent. of ear cases in the evacuation hospitals. From the evacuation hospitals 4½ per cent. of ear cases are evacuated to the rear. In the rear of the zone des Armées, in the zone des Etapes, ear cases form 6¼ per cent. of total sick. These figures rise during time of inactivity at the Front and fall during military activity. Seven per cent. of these cases are evacuated from the zone des Etapes to the Interior. In the Interior region, ear cases form 9 per cent. of total sick. I estimate that about 80 per cent. of the ear cases will show considerable impairment of function. This impairment will be sufficient to interfere permanently with the civil occupations of the patients. The above figures are for 1917, some of them approximate."

These figures obviously include all ear troubles, infective and traumatic, but even then they are sufficiently alarming. One recognizes that an ear damaged even slightly by the bursting of a shell is more liable to the invasion of pathogenic organisms and to suppurative processes. My experience leads me to believe that in the British forces the number permanently incapacitated from injuries and diseases of the ear is smaller than that of the French forces.

In the early days of the war the large number of cases of deafness after shell explosion, the intensity of deafness, and sometimes long persistence of this symptom, gave serious ground for fearing a serious lesion comparable to that of labyrinthine hemorrhage. This is disproved by the subsequent history of cases and by the available postmortem examinations. There have been published alarming percentages on the subject, based on conclusions from an insufficient number of cases. While total and seemingly incurable deafness is rare, yet according to Jobson[2] a large number who have been exposed to a heavy bombardment which caused severe or complete deafness for one or more days and who declare they now hear quite well will be found on examination to have some definite signs of deafness. In a series of examinations Jobson found a large majority, more than 80 per cent., were quite unaware of being deaf.

Lannois and Chavanne report on 1,000 patients whom they had seen at Lyons up to June, 1916. These they classify as follows:

1. War deafness in patients having auricular lesions in process of evolution with a nonhealthy auditory mechanism: (*a*) Chronic suppurative otitis media, 189 cases. (*b*) Sclerosis of the middle ear affecting or not the internal ear, 134 cases.
2. War deafness in patients with healthy auditory meatus: (*a*) Simple labyrinthine concussion, 262 cases. (*b*) Labyrinthine concussion with rupture of the tympanum, 82 cases. (*c*) Labyrinthine concussion with rupture of the tympanum, followed by acute suppurative otitis media, 301 cases.
3. War deafness or deafmutism from traumati: neurosis, 32 cases.

In this report there is one group which requires the attention of otologists—(*b*) and (*c*) of Section 2. The fact that out of 383 cases of shell concussion with rupture of the membrane, only eighty-two escaped suppuration does not speak well for our treatment of early cases. This is no reflection on the distinguished Lyons otologists who probably saw many cases after suppuration had started. The number of cases of acute suppuration following rupture is in the armies of all the combatants in excess of what it ought to be and can be reduced by early satisfactory treatment.

In one stationary hospital near the front, to which victims of recent shell shock were sent, including men suffering from shell shock deafness, I saw 200 patients with little or no trauma exhibiting nerve symptoms ascribed to high explosives. Of these, 50 complained of deafness of varying degree. Of the 50, 17 showed demonstrable symptoms of injury to the internal ear

1. Bryant, W. S.: Prevalence of Ear Injuries and Diseases in the French Army, Jour. Laryngol., Rhinol. and Otol., 1917, **32**, 338.

2. Jobson, T. B.: Lancet, London, 1917, **2**, 566.

traceable to the explosive. Among the other 33, either the deafness had been temporary and no objective signs of disturbance of equilibrium could now be seen, or the persisting defect of hearing was due to middle ear involvement, in some of old standing, or to blockage of the external canal from wax or some other cause. Of the 17 cases, 7 had symptoms of nerve deafness without perforation; 6 had definite middle ear trouble previous to the concussion, and of the other 11, with no previous history of ear trouble, 6 had recent perforations; 12 complained of vertigo and had observable signs due to it; the other 5, when examined, had no symptoms of disturbances of equilibrium.

A large proportion of the men suffering from shell concussion deafness get better very rapidly, in one ear usually more rapidly than the other. Those with simple rupture of the tympanum without suppuration are the first to recover; about 50 per cent. of these have serviceable hearing within a month. My experience is that even those showing slight improvement at the end of one month may still improve. But the longer the delay in improvement, the less likely they are to get better. The most obstinate are simple labyrinthine concussions, in which, according to Lannois and Chavanne, there are only 24 per cent. of cures in the first month.

SHELL SHOCK DEAFNESS DEFINED

The term shell shock deafness, so commonly applied to these cases, has a fascination for the lay mind. Its vagueness as a medical term serves to emphasize our ignorance of its pathology. Shell shock deafness means that the patient has been made deaf by the concussion of the shell associated, it may be, by little obvious injuries due to its bursting. In many the probability of internal injury to the nervous system must be considered. By the force of the explosion the soldier may have been blown violently against the parapet or walls of the dugout, or hurled for some distance through the air, or struck by débris from the destruction of neighboring buildings. One man described it as a soft irresistible force pushing him up against the parapet wall close to which he was standing when the shell burst in the trench. As a result of the explosion the men may be buried for a varying period, and, as Mott[3] pointed out, this may have an important bearing on the symptoms which follow. It must be noted that, though not observable to the casual examiner, a trauma to the ear is frequently present and observable to the otologist. In recent cases seen by me, minute ruptures were observed which under ordinary conditions would close in a week; and when no rupture was seen, the congested condition of the membrane and of the middle ear indicated that the blow had been sufficient to cause considerable disturbance. In many of the cases seen some time after the concussion, in which no trauma had been diagnosed at the first examination, the history of aural hemorrhage and of rotation vertigo made it more than likely that an injury to the peripheral aural mechanism was present at the time of the explosion. But if the term shock is to be condemned as too indefinite, it is just as important, perhaps more so, to avoid as far as possible the terms hysteria and neurasthenia. These elastic and indefinable terms are too often applied to such cases, probably less often now than in the early stages of the war, and have resulted not only in an unwarranted stigma but often in disastrous effects. The cases under review will be discussed in some measure to ascertain how far the psychogenic explanation may be accepted.

3. Mott: Effects of High Explosives on the Central Nervous System, Lettsomian Lectures, Tr. Roy. Soc. Med., London, 1916, 9b.

RELATION OF THE EAR TO PRESSURE

The ear is the peripheral sense organ which *a priori* we should have expected to suffer greatly from concussion effects. Like all peripheral organs, it is a mechanism adapted to transform one form of external energy into nerve impulses. There are two separate and distinct mechanisms in the internal ear, one concerned with the hearing, and one with equilibrium. Each of these mechanisms is adjusted and made sensitive to register minute pressures and transform them into nerve impulses. The nerve impulses are carried to the central nervous system, there to be interpreted and utilized. In hearing, air vibrations (varying, say, from thirty-two double vibrations per second up to several thousand double vibrations per second) in various combinations are transmitted normally through the external auditory meatus to the drum membrane, which is finely swung to catch them. The vibrations are then transmitted through the ossicles and the middle ear to the cochlea, where they are transformed into nerve impulses. Nerve impulses may also be set up in the cochlea by vibrations through bone, but these, so far as hearing is concerned, are of secondary importance. The nerve impulses are conveyed along the cochlear nerve and the acoustic path to the temporal lobe, where they enter in one definite bundle. Here they come in association with various parts of the cerebrum. The route from the periphery to the temporal lobe is not one undivided path. To put it roughly, there is not one telephone wire from the ear to the receiving and interpreting station in the cortex. The path is broken at various synapses or junctions or telephone exchanges. At these synapses connection is made with other nerve paths, and communication can be and is established with other physiologic systems. What the significance of this probable interchange and influence on other paths may be, we do not know.

The other pressure mechanism in the internal ear is a system of canals containing fluid, a manometer, so designed as to register and signal to the central nervous system movements of the head. This mechanism is adjusted to indicate very small varying pressures. Here, also, in the central path, we have numerous synapses influencing other cranial pathways, somewhat better though still very inadequately understood. The information so obtained from the vestibular peripheral mechanism is coordinated with information received from other sources (the eyes, the joints, etc.), and enables the muscular mechanism to adapt itself rapidly to varying alterations of our center of gravity to preserve the equilibrium, for instance, to maintain the erect posture during movements of the head. There are certain limits of pressure normal to these two mechanisms. Pressure beyond the normal produces disturbances which are pathologic. Disturbances of the canalicular system produce disturbances of equilibrium, for instance, vertigo and nystagmus.

PATHOLOGIC EFFECTS OF EXPLOSIVES

Our knowledge of the pathologic effects of explosives on the ear has come largely from the experimental work of Witmaack, Yoshii, and Hoesli, who investigated the results of pistol or revolver shots near

to the ear of animals, chiefly guinea-pigs. Yoshii's[4] work is the most complete, the experiments being in two series: effects of firing a single shot, and effects of firing repeated shots daily over a definite period. Some of the animals were killed at once, others were kept alive for a varying number of days, up to sixty. His findings in the first series may be thus briefly summarized: There were very constantly rupture of the tympanic membrane and hemorrhage into the middle ear cavity. Pathologic changes were present in all the coils of the organ of Corti. The hair cells were swollen, had lost their characteristic shape and were loosened from their support. Deiters' cells had lost their normal appearance and appeared as a homogeneous mass. The cells of Hensen were flattened out. The pillars of Corti were bent and the tunnel filled with a homogeneous mass, probably of extravasated cell contents. Nuel's space could no longer be seen. The tectorial membrane was raised sharply up and in extreme cases its free end reached Reissner's membrane. In recent cases blood corpuscles were seen in the scala tympani and in the vestibule. Immediately after the firing, a change was observable in the ganglion cells of the cochlear nerve. The Nissl bodies had disappeared and the chromophile substance was no longer distinguishable. In the nerve fibers, changes were seen, especially in the myelin sheath. As a result of repeated pistol shots, the pillars had collapsed and all the cells had lost their characteristic shape. This was especially observable in the region at the junction of the basal coil to the second coil where a complete atrophy of Corti's organ could be seen.

These changes were observed immediately after the explosion and had reached their maximum in two or three days. Then a restorative process slowly set in, especially in the basal coil. In animals killed after eight days, the pillars were straightening out and the mass in the tunnel was absorbed, though the cells were not clearly outlined. Later regeneration proceeded in all the cells, but even after sixty days, the hair cells and Deiters' cells were not fully reformed in the basal coil and could not be distinguished in the other coils. At this time the ganglion cells were again nearly normal.

This work ought to be repeated in other mammals. So far, my results in dogs and cats do not give so extreme a picture.

HYPOTHESES ADVANCED TO EXPLAIN SHELL CONCUSSION DEAFNESS

The pathology of nerve deafness from high explosives is still little known. Complete pathologic examinations have been few. The involvement of the middle ear seen in a large number of patients, with or without rupture of the tympanic membrane, will produce diminution of hearing but will not account for the total deafness to air and to bone conduction, as well as other symptoms, which follow the explosion. We have, therefore, to look for some explanation in the inner ear or its central connections.

The following hypotheses have been advanced: (1) pathologic changes in the organ of Corti and the ganglion cells in the internal ear; (2) hemorrhages into the inner ear; (3) interruption of the central auditory path from small hemorrhages, edema, etc., and (4) temporary interruption of the central auditory path from functional disturbance, not due to any organic lesion.

J. S. Fraser and John Fraser[5] of Edinburgh have recently published the results of pathologic examinations of four cases of concussion deafness. The only changes found were: (1) rupture of the drumhead in three cases, and hemorrhage into the middle ear spaces in all four, and (2) hemorrhage in the fundus of the internal meatus in three of the four cases at the point where the nerves enter the bony canals. The vestibular apparatus showed very little change. The examiners conclude, "It seems quite possible that in many cases of 'shell' or 'explosion' deafness we have to deal with a functional affection, as suggested by Milligan and Westmacott. On the other hand, rupture of the drumhead and hemorrhage into the middle ear spaces must cause a certain loss of hearing, while hemorrhage in the fundus of the internal meatus may give rise to deafness, tinnitus, giddiness, and other symptoms of an inner ear lesion." The functional hypothesis is supported by the report of a pathologic examination of an ear by Mr. Sydney Scott,[6] who found no change in the internal ear.

While in France, I was able to secure several petrous bones from patients who died shortly after injury from shells. In all there was complete deafness. Two have been sectioned and studied, one of which briefly I wish to describe.[7]

The right drum membrane had a small rupture in the posterior half, but there was little blood in the tympanic cavity. The petrous temporal was congested, as were also the meninges. Both petrous temporals were removed within six hours of death and the superior semicircular canals were opened. The bones were placed in formalin, which was changed repeatedly during the first ten days.

These sections showed the following conditions:

I. At the deeper part of the internal auditory meatus where the cochlear nerve enters the modiolus, there were dilated small veins with small hemorrhages due to rupture (by rhexis) and also hemorrhages through the interstices of the capillary walls (by diapedesis).

II. Edema was seen, also infiltration of small cells throughout the area of the cochlear ganglion. In some of the ganglion cells the nuclei were well stained, but as a rule the cell contents were very indistinct.

III. The scala vestibuli and the scala tympani had no hemorrhage.

IV. The ductus cochlearis showed the following important changes:

1. The membrana tectoria was thrust sharply up and was attached to Reissner's membrane by serous effusion.

2. There was a small cell exudate along Reissner's membrane, especially marked in the areas near to the attached membrana tectoria.

3. The stria vascularis was edematous and showed hemorrhagic infiltration.

4. The basilar membrane was edematous and showed small cell infiltration.

4. Yoshii: Experimentelle Untersuchemgen über die Schädigung des Gehörorgans durch Schalleinwirkung, Ztschr. f. Ohrenh., 1909, **58**, 200-252.

5. Fraser, J. S., and Fraser, John: Morbid Anatomy of War Injuries of the Ear, Jour. Laryngol., Rhinol. and Otol., 1917, **32**, 340-369.

6. Scott, Sydney: Proc. Roy. Soc. Med., Otological Section, London, March, 1916, p. 29.

7. The pathologic results and the history of cases have been given fully in a lecture before the Harvey Society of New York and will be published in full in the volume of Harvey Lectures for 1917-1918.

5. In the organ of Corti there were numerous small cell infiltrations, and there was serous effusion which filled the tunnel and the Nuel spaces. The pillars of the tunnel were unaltered. The other cells were indistinct. In some of the hair cells the hairs could be distinguished.

V. The vestibular mechanism was very little affected, except that there was a slight dilatation of the veins and some serous effusion and edema. No rupture of the membranous labyrinth could be seen and there was no hemorrhage into the canals.

VI. The foot plate of the stapes was uninjured.

These microscopic findings corroborate those of J. S. Fraser and J. Fraser, though in addition there was present the upward thrust of the membrana tectoria so characteristic of the experimental work on guinea-pigs already referred to. The findings tend to substantiate the hypothesis that deafness from the effects of high explosives may result in distinct damage to the peripheral organ of hearing, with little damage to the middle ear or the drum membrane.

GENERAL SYMPTOMS OF NERVE DEAFNESS FROM SHELL CONCUSSION

We are here concerned chiefly with the results of one severe concussion, followed by total or diminished loss of hearing. In some of the cases, a previous concussion may have damaged the hearing, and the second made it worse, or resulted in total loss. Cases of gradual diminution of perception of sound from long exposure to gunfire do not come within this paper.

The otologist is accustomed to differentiate two types of deafness: (1) conduction or obstructive deafness when the lesion lies in the external or middle ear, and (2) nerve deafness when the lesion lies in the internal ear or its central connections.

There are tests which enable one fairly accurately to determine which type one is dealing with. With both obstructive and nerve deafness, it is often very difficult to assign a relative value. In shell concussion deafness we are, as a rule, dealing with a mixed type.

In testing cases of deafness following exposure to shell concussion it was noted that we were dealing with a type which, so far as I know, is not usually noted in civil practice. The chief characteristics are:

1. There is a diminution in the tone perception both for bone and air over the whole range of the forks.

2. When hearing is markedly diminished, the diminution for the forks is marked at both ends of the scale and is least marked at about C^2 (512 d. v.) and C^3 (1,024 d. v.).

3. When hearing is completely obliterated there may still remain a remnant to bone conduction in the region corresponding to the C^2 fork.

4. With restricted tone perception with the use of a greater intensity, it is sometimes possible to extend the area of sound perception.

In considering these findings, it is well to recall that physicists place the localization at which a minimum of energy will produce audible sounds at about 1,000 d. v. below rather than above this figure. Further, otologists[8] claim that from 480 d. v. to 768 d. v. "is the most important part of the sound scale for hearing and understanding speech." These facts throw light on our findings that in concussion cases perception may linger for the tones C^2 (512 d. v.) and C^3 (1,024 d. v.), while tones above and below fall below the threshold of audible sounds. It brings this area into parallel with the macula of the retina and its relation to vision. It makes of interest our findings that associated with concussion deafness there is concentric limitation of the field of vision. In addition, since in concussion deafness, increasing the intensity extends the area of sound perception, this would further strengthen the analogy; for in indirect vision the more the object is illuminated the further it can be seen at the periphery.[9] The elaboration of this subject must be left for a future paper.

8. Bezold and Siebenmann: Textbook of Otology, Chicago, 1917, p. 71.

NERVE SYMPTOMS ASSOCIATED WITH THE TOTAL LOSS OR DIMINUTION OF HEARING

The symptoms frequently associated with loss of hearing from high explosives are included by neurologists within that group of nerve diseases called traumatic neuroses. In some of our cases there is a recognizable physical trauma, in the head or elsewhere, received during a period of mental excitement. In addition to deafness, which was the chief complaint of the men who came to the otologic wards, there were other symptoms, varied and complex. There were present, for instance, exaggeration of tendon reflexes, tremors, vasomotor disturbances, sweatings, lethargy, sleeplessness and headaches. Vertigo, with disturbances of equilibrium, is very commonly present and very much complained of. There was frequent concentric narrowing of the field of vision. In many of our cases, fields of anesthesia were present. In two of my cases of total deafness, there was complete anesthesia and loss of thermal sense. In one with total loss in one ear and great diminution in the other, there was anesthesia on one half of the body and hyperesthesia on the other. The ear symptoms accord with those which Déjerine classifies under traumatic hysteroneurasthenia. Some patients, as in neurasthenia, had hyperacusis with subjective sounds; others, as in hysteria, had the auditory acuity diminished, sometimes on both sides, sometimes on one only.

While granting that the symptoms accompanying the deafness often, but not always, fall within Déjerine's classification of traumatic hysteroneurasthenia, yet one would err if one were to insist that the nerve deafness is to be explained as due to a functional neurosis. The sudden onset of these labyrinthine symptoms and the slowly accumulating, though as yet very meager, pathologic findings make one chary of fully accepting the neurosis hypothesis in all these cases. A study of the ear cases that have come under my observation has convinced me that in a large number the trauma has caused an organic lesion and that the functional symptoms are secondary and subsequent to it. It is altogether possible that these functional symptoms will persist after all traces of the traumatic lesion have ceased to be capable of recognition.

CASES SEEN SOON AFTER INJURY

The cases of deafness as they present themselves soon after injury show a variety of types. All the patients have been more or less dazed. Some are admitted as stretcher patients in varying depths of stupor. In many, the stupor or unconsciousness has passed off previous to admission. All have a varying amount of vertigo, but nystagmus due to labyrinthine irritation I have never seen. Of twenty-two patients

9. Luciani: Human Physiology, London, 1917, 4, 339.

with nerve deafness examined soon after the shell explosion, eighteen had demonstrable lesions of the drum membrane. Four had no demonstrable lesions, and of these four, three had the history and indication of old trouble, and one had had no previous ear trouble and no demonstrable trauma.

Next to deafness, vertigo is the chief complaint. It is very difficult in many to estimate the amount of vertigo that is present. Vertigo is a subjective sensation and subjective sensations are difficult to describe; the average individual has a very indefinite idea of what medically we mean by dizziness and often includes in the term all variations in cerebral consciousness. But even moderately severe labyrinthine vertigo is accompanied by some objective signs such as nystagmus, pointing error, and signs of unstable equilibrium such as may be produced by shutting the eyes on standing or walking. In many the objective signs of vertigo quickly passed away. The greater number were comfortable so long as they remained quiet or moved slowly. It was experienced if the head were placed quickly in an unusual position and was especially apt to occur in bending. There did not appear to be any relation between the return of hearing and the disappearance of the vertigo. Of eighteen men carefully examined for signs of vertigo, twelve gave a distinct history and showed signs of labyrinthine vertigo. Six had no objective signs of vertigo.

CASES SEEN SOME TIME AFTER INJURY

In the cases of deficiency in hearing, following exposure to or injury from high explosives, the patients seen by me at the base hospital date the onset of their deafness back anywhere from two months to eleven months. All have been under treatment since the injury, many in the care of competent otologists.

The patients may be divided into three groups:

1. Those with nerve deafness.

2. Those who have had nerve deafness of a varying degree, and who, with a varying amount of indefinite nerve symptoms still have the fixed idea that they cannot hear. This group includes cases in which the patient hears without being conscious of doing so.

3. Malingerers. The majority in this group undoubtedly have had shell concussion which affected the hearing. At the time of examination, many still showed traces of traumatic neurosis. But they have now recovered, partially or entirely, from the defective hearing and are consciously exaggerating the defect still remaining or consciously asserting its persistence.

It is with the first group that I am here concerned. It may be said in passing that it is a difficult matter to separate the second from the third group. Experience, the general condition of the patient, his answers to the test questions, largely aid the examiner. To the second group belong the cases that yield to suggestion or recover hearing rapidly, often completely, after excitement or intense stimulation. To discuss the third group and show how the malingerers may be detected is outside the limits of this paper.

CASES OF NERVE DEAFNESS

The patients now to be considered have been exposed to and had their hearing damaged by the shell explosion. My endeavor will be to outline the treatment that I found beneficial in these cases. Patients with wounds in the temporal bone are for the present excluded. I deem this advisable because I wish to focus attention on the concussion. In some cases there were injuries from pieces of shell in a part of the body remote from the ear. But these are cases in which the trauma could not have damaged the internal ear. It is scarcely necessary to say that there are eliminated cases in which a trauma to the ear has come from the explosion, but in which the deafness, when examined, was evidently middle ear in type and in which no evidence of nerve deafness was present at that time.

It was not judged sufficient to take the patient's statement that he had been exposed to shell fire. It was necessary to have at the time of examination symptoms pointing to such exposure or official records supporting the statement. It must be remembered that it is not possible in a military hospital on the lines of communication to keep patients long. All we could do was to keep as long as possible those promising improvement and to suggest further treatment.

TREATMENT OF CASES OF CONCUSSION DEAFNESS

Although the number of the totally deaf is relatively not great, yet it may be said that, even at best, a large number of men are left at the end of two or three months with marked impairment of hearing, whc show little or no tendency to improve. If left alone, they are not likely to improve. They are deprived in no small measure of the pleasures of social life and hampered in their industrial outlook. The question then arises, can anything be done for them to improve the remnant of hearing still present, or must we fall back on such advantages as lip reading offers?

In my work it was early observed that when the forks could not be heard by air or bone, it was possible, by summation of stimuli, to get the tone perceived through the mastoid. To make sure that this was so, the patient, if totally deaf, was required to hum the tone. It was further noted that, after repeated applications of the fork, the time required for the perception of the tone gradually decreased, and that at this period the patient was able to perceive the tone passed into the ears by tubes attached to resonating boxes and later directly into the ear.

With these observations as a basis, the following treatment was adopted, varying in accordance with the degree of deafness present:

1. Tuning forks were sounded and the vibrations conveyed to the ear, first, by bone conduction through the mastoid; secondly, through resonators attached to the ear by tubes; and thirdly, through the air. In our worst cases the time given to each of these processes varied with the amount of deafness. In the totally deaf it was sometimes found difficult to pass from bone to resonator. In these cases we found it convenient to use the resonating box of the piano.

2. The voice was used through resonators with a tube to the ear, with speaking tubes, and without any aid.

Each period of treatment was short, for fatigue was rapidly produced. If the treatment be too long, headaches, vertigo, and occasionally pain was complained of and profuse sweating was very frequently present. At each successive stage we had to use summation of stimuli; thus, not only must the fork on the resonator be kept up for some time, but with the voice we had to repeat the word, but even then there was a marked delay before the response came. In the later stages, this delay was still present. Then it appeared to be not so much that the patient did not hear, but that he hesitated to attach the word to the sound, for, if asked

what he thought it was, he frequently answered correctly.

3. As soon as possible, carefully graduated physical exercises were given, in which the two essentials are short duration and no bending. The treatment, except the drill, was given twice a day in the worst cases; it ought to be given twice in all.

4. As early as possible, we ascertained if the semicircular canals were functioning, because when there was reaction to the caloric or the rotation tests in totally deaf patients we felt justified in continuing treatment for some time.

In some cases in which an ear was totally deaf with a normal vestibular mechanism, we failed to get any response; in those, however, who had not total deafness but some perception of sound, all the patients improved, some very considerably.

There is nothing new in the stimulation of the auditory nerve by sound. Marage[10] of Paris has long asserted that in suitable cases the use of sonorous vibrations produced by a siren which he has specially constructed is of benefit to improve the hearing. My method differs from his in that I prefer tuning forks and the voice conducted through resonating boxes to stimulate the auditory mechanism. He has applied the method in suitable cases of war deafness. He uses sonorous vibrations by means of a siren in which the air pressure reaches about 5 mm. of air, for as he says, "it must not be forgotten that even a very deaf man is often very sensitive to the weakest sounds."

His results are very interesting. "I consider," he says,[8] "a patient to be a success when at the end of the treatment he hears sufficiently to rejoin his regiment." Sixty-eight per cent. were able to return to the front, of whom almost half were reported to him as very deaf, many as incurable. Of the nonsuccessful cases, 10 per cent. were totally deaf and remained so. The others have attained the power of hearing when one speaks close to the ear without raising the voice and can be used in certain auxiliary services.

A question of very great importance and one that will require very careful forethought is how far lip reading should be taught in such cases. My experience leads me to believe that in the cases under consideration lip reading should not be used until some method corresponding to the foregoing be tried.

SUMMARY

1. In deafness resulting from concussion due to high explosives, there is frequently a trauma demonstrable in the ear. The perception of sound is diminished over the whole normal range both for bone and air conduction. This diminution may be so great as totally to abolish perception of sound.

2. In the totally deaf who improve, bone conduction is perceived before air conduction. In these cases summation of stimuli plays an important part in the perception of sound. It is essential to differentiate vibrations from musical tones.

3. There is a marked diminution of the duration of hearing along the whole series of forks, both through bone and air.

4. The normal stimulus (musical tones or voice) is an adequate stimulus for the nerve and is the best stimulus. Electricity is contraindicated and liable to do harm, since it easily produces vertigo.

5. If the conducting mechanism is damaged or destroyed, it not only takes longer to get improvement, but complete recovery cannot be expected.

6. As the deafness diminishes, there may persist for a long time an inability to grasp intelligently what is said or to retain the memory of it. Thus a word may have to be repeated two or three times before the patient gets it; or, if he is asked to repeat two or three numbers given consecutively, he will repeat the last one. He knows that there were others but did not get them.

7. Pathologic examinations show that the auditory mechanism may be seriously damaged, while the vestibular shows little or no change. Therefore the vestibular mechanism may react to stimulation in cases in which the cochlea is seriously damaged. The large percentage of cases of early recovery speaks against any very serious damage to the organ of Corti in the majority of the cases. The absence of islands of deafness speaks against the destruction of a part of the cochlear organ.

8. Prognosis is good as a rule, especially if there is no history of marked aural vertigo, and a normal caloric reaction. The most noteworthy exception met with so far is damage to the seventh nerve. In these cases if hearing returns, it returns but slowly, and so far as I have observed, not perfectly even with a normal drum membrane, and the caloric reaction present.

9. While a psychogenic factor cannot be denied in concussion deafness, the frequency of labyrinthine symptoms immediately following the shell burst speaks against an exclusive view of the psychogenic explanation of nerve deafness.

10. The progressive recovery of hearing so constantly observed suggests that, in the light of our pathologic and experimental knowledge, we are dealing with injuries of the nature of contusions with edema, capillary hemorrhages, changes in the myelin sheaths and molecular changes in the nerve cells. That in the majority of concussion cases we have a marked destruction of the organ of Corti or a definite lesion of the auditory cortex appears to me doubtful, for in both of the regions we are dealing with a highly specialized structure in which regeneration would be unlikely.

10. Marage: Treatment of Deafness Resulting from War Wounds, Comp. rend. Acad. d. sci., 1915, **161**, 311-322.

ABSTRACT OF DISCUSSION

Dr. Thomas Hubbard, Toledo, Ohio: I found a device that was originally intended to protect gunners but has since been used more extensively to protect the ears of swimmers. It is a rubber thimble affair made in two sizes, and the voice can be heard through it. I know nothing as to its efficacy in preventing injury from severe concussion. I am positive, however, that in all cases great care must be taken in using any device to see that no plug of wax is pressed against the drum. In some cases one might shove in a hard plug of wax that would lie up against the drum and in that way, of course, temporarily impair the hearing.

Dr. E. B. Dunlap, Tulsa, Okla.: In June, 1917, I was at the Central London Hospital, and after one of the air raids eight people attended the ear clinic. They were employees of the general postoffice, in which two or three people were killed. These eight people had discharging ears, either one or both ears. When only one ear was discharging, the ear that did not discharge was protected by a plug of cerumen. There were two or three of these cases. In all cases the discharge was started by a concussion. These people had never had discharging ears before, except one—a man who had an old perforation—and this discharge started immediately, but no sooner than the others. When these men did not have a discharge in both ears, in every case they had a plug of cerumen to protect the drum membrane.

DR. H. W. LOEB, St. Louis: It seems to me that Dr. Wilson has gone even farther than Fraser in establishing some sort of organic basis for all of these conditions. I notice that in referring to the work of Bourgeoise and Sourdille, they claimed that when the shell explosion is in the open, unilateral deafness results, whereas if it is in an enclosed space, as in the trenches, it is likely to be bilateral. I would like to ask Dr. Wilson what he knows about this.

DR. SAMUEL D. HIGGINS, Milwaukee: I think it might be interesting to report a case of unilateral deafness that occurred in Milwaukee a few years ago when the McNamara brothers blew up a large coal bin. This man was injured by the explosion; only one membrane was ruptured, however. He had no deafness and no difficulty in the ear which was apparently not affected. The ear in which the drum was ruptured suppurated, but only for about two weeks. His main difficulty was shock. He was frightfully nervous and the best aid was the first aid which was given to him six hours after the explosion occurred.

DR. J. GORDON WILSON, Chicago: The ear protector I have shown will soon be on sale. All at present made have either been sent to the ordnance department or to France. Rubber or some plastic material such as wax molded into the external ear undoubtedly hinders concussion deafness, but these also block the entrance to sound waves and the soldier is thereby prevented from hearing orders. Regarding the benefit to be anticipated from ear protectors in the prevention of some forms of shock I can give no opinion, though I believe that very possibly they will be of use.

PREVENTION OF PNEUMONIA*

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Last autumn little attention was given to pneumonia as a probable menace to our newly formed army. The reports of only moderate or slight incidence of pneumonia among the French and English armies gave a feeling of security concerning this disease. We were not without warnings, however, for even in times of peace pneumonia had been the most fatal of the acute infections among soldiers, as it is among the civilian population. The experience of the troops along the Mexican border during the preceding year had also given some indication of the danger of this disease. With the onset of colder weather, in October, the prevalence of pneumonia among the troops became serious. During November and December it became alarming, and in certain camps it reached epidemic proportions. Its prevalence among the soldiers has not yet entirely ceased, even with the coming of warm weather. Previous experience, however, indicates that it will probably become less during the summer, but unless preventive measures are found and properly instituted, we run the risk of a repetition next winter of the experience of this. It is very fitting, therefore, that we devote a short period to the discussion of the measures for prevention of this disease. Time will not permit a review of all the details of preventive measures, and I shall therefore limit my remarks to a consideration of the principles involved.

A year ago, a discussion of this subject would have embraced only a consideration of the prevention of acute lobar pneumonia due to pneumococcus. War causes rapid and unexpected changes. During the past few months, the experience in our army camps has entirely changed our point of view. Today, in considering this question, not only must we consider acute lobar pneumonia, but we must also include in our discussion broncho or lobular pneumonia having an entirely different etiology.

The fact that two distinct diseases existed in our camps was not at once generally recognized, and even in the camps where this knowledge has existed, it has not always been possible clearly to differentiate the cases of the different kinds. Consequently, the relative incidence of the two varieties of pneumonia during this first year of the war will never be known. Both kinds of pneumonia have prevailed in most of the camps, frequently simultaneously. Fortunately knowledge concerning the methods of differential diagnosis is now much more widespread than it was last winter, the laboratories are better equipped and better organized, and in the future the different kinds of acute pulmonary infection will undoubtedly be better differentiated, with a corresponding gain in our knowledge of epidemiology and mode of distribution.

Our consideration of the prevention of pneumonia will probably be rendered more clear by an independent consideration of the two diseases, for they must be considered such, at least from the standpoint of prevention.

ACUTE LOBAR PNEUMONIA DUE TO PNEUMOCOCCUS

The pneumococcus is a widely distributed organism in the mouths of healthy individuals, and since it survives for considerable lengths of time in dust, great opportunities exist for its widespread distribution, especially when persons live in close association.

A most important question, therefore, is, do persons acquire the disease because they receive the bacteria into their mouths, or on their respiratory mucous surfaces, or is the important etiologic factor something antedating this, something which causes a change in susceptibility of the host either local or general? Does infection then occur with those organisms in the mouth which have the greatest tendency to grow parasitically? It is obvious that the answers to these questions are of great importance as regards prevention, for in the one case, the chief attention must be given to measures for preventing the distribution of the infectious agent, and in the other, this is of little importance, and the chief attention must be given to the factors influencing resistance.

So long as all pneumococci were considered identical, we indeed had little justification for attempting to limit pneumonia by preventing the spread of the infectious agent itself, but were driven to the conclusion that the only factor of importance was the resistance of the individual. The demonstration, however, that pneumococci are not all identical, that the types responsible for two thirds of the cases, and these the more severe, are found only in the mouths of those sick of the disease, in the dust in their immediate environment, and in the mouths of a very limited number of healthy carriers who have been in close association with these patients, at once justifies attempts to prevent pneumonia by limiting the distribution of these more parasitic types of pneumococci. So far as pneumonia due to these types of organism is concerned, the conditions do not differ essentially from those in diseases like diphtheria or cerebrospinal fever, in which the acquiring of the infectious agent is considered of primal importance. Healthy carriers of

* From the Hospital of the Rockefeller Institute.

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the organism causing these diseases also are known to occur in considerable numbers. It is true that in pneumonia, due to these types of pneumococci, direct infection of one patient from another is not nearly so often obvious as it is in the case of diphtheria, for instance. All physicians who have had much experience with pneumonia, however, have seen examples of contact infection, and recently special studies have demonstrated the not infrequent association of cases due to pneumococci of the same type. This evidence seems sufficient to justify the attempts to prevent the spread of infection from patients sick with these types of pneumonia, provided this can be done without too great an expenditure of effort and expense.

There exists, moreover, further justification for the employment of this kind of preventive measures, even in all types of lobar pneumonia. It has long been known that the best way to render bacteria virulent for any species of animal is repeatedly to pass the bacterium through such animals, with each passage inoculating sufficient numbers of the bacteria to cause severe infection. We have no means of testing the virulence of a given race of pneumococci for man, since the virulence for different species does not run parallel; but supposing that the virulence of a given mouth strain is not very great for man, it is obvious that causing human infection may render it more pathogenic and invasive for the human species. Hence, if pneumococci from patients suffering from pneumonia are taken into the respiratory tract of healthy individuals, they are more likely to produce severe infections than are organisms that have been leading a more or less saprophytic existence. More stress than previously, therefore, should be laid on preventing the dissemination of pneumococci from patients sick of the disease.

ISOLATION AND VACCINATION

On the other hand, common experience indicates that the factor of lowered resistance cannot be neglected. It is true that here we are dealing with questions for the solution of which direct or experimental evidence is difficult or impossible to obtain. Acute lobar pneumonia prevails to the greatest extent in cold, stormy weather. In the army there have undoubtedly occurred much exposure and fatigue among the men who have suddenly changed their habits of life. In the prevention of pneumonia, therefore, measures to prevent undue exposure and lowering of resistance should be instituted, and in addition, isolation of pneumonia patients should be carried out to as great an extent as is practicable. In addition to these methods, however, there exists another possible way of preventing acute lobar pneumonia, which, if successful, would probably render all the other measures unnecessary. I refer to vaccination. Animal experimentation now gives a rational basis for this procedure, at least as far as Types I, II and III are concerned. The first important studies in this direction have been made by Lister in South Africa, where pneumonia among the natives working in the mines has for many years been a serious matter. He has now carried out preventive inoculation on a large number of men with striking and definite results. During the past winter, Cecil and Austin, working at the Rockefeller Institute and at Camp Upton, have conducted investigations as to the best method of preparing vaccine, the proper dosage to employ, etc., and have vaccinated more than 12,000 soldiers. Although sufficient time has not yet elapsed to make the results conclusive, it is of great significance that while a considerable number of cases of pneumonia have occurred among the uninoculated men in this camp, not a case of pneumonia due to pneumococci Types I, II or III has occurred among the inoculated men, the latter having received vaccine containing these types of pneumococci. Certainly the results obtained are sufficiently promising to justify the trial of this procedure on a much larger number of soldiers during the coming winter.

STREPTOCOCCUS PNEUMONIA

Only during the past winter has much attention been given to this form of disease as affecting large numbers of adults or occurring in epidemic proportions. So far as can be determined, the bronchopneumonia which has existed so widely in the camps has been due to one organism, a hemolytic streptococcus. Reports of the occurrence of pneumonia due to nonhemolytic streptococci have been sent in from various camps, but these demand verification. All the streptococci isolated have not been identical in their power to ferment the various sugars, and they have differed to a less degree in the appearance of the colonies formed by them. Whether these differences are important is not yet certain, but it seems that these properties are not entirely fixed and therefore are not, strictly speaking, diagnostic ones. It is not yet known whether all these organisms are immunologically identical. It is obvious that knowledge concerning the identity or nonidentity of the different strains is of very great importance from the standpoint of prevention. If the organisms are all the same, the problem is relatively simple. If, however, they are not identical, we must consider that the essential factor in inducing the epidemic was something apart from the organisms themselves. Moreover, if we are dealing with an infection due to a group of organisms, the study of carriers and the tracing of the spread of the disease will be rendered most difficult. The difficulties will be greater still, if it should be found that certain hemolytic streptococci identical with those causing the disease, but having no pathogenic properties for man, exist widely distributed outside the human body, and are also present as harmless saprophytes in the throats of very many healthy individuals.

It may be stated, however, that all the observers who have had much experience in the study of the flora of normal throats agree that actively hemolytic streptococci are found only with the greatest rarity in normal throats, except in the presence of epidemics of the so-called streptococcus sore throat, or streptococcus pneumonia. It is known that hemolytic streptococci do exist very frequently in milk, even in milk which is produced under the very best conditions, and also in milk products, such as cheese and butter. Intensive study, however, is showing that these streptococci, which have been described as of the bovine type, may be differentiated in practically all cases from those of the variety pathogenic for man, which has been called the human type. This differentiation is not entirely without difficulty, but with increasing knowledge is becoming more and more easy. In the epidemiologic studies that have been carried out in the army so far, great attention has not been paid to the differentiation of these two types, but this is probably not of extreme importance, since experienece shows that streptococci of the bovine types are not

frequently found in human throats, certainly not in large numbers. At present, therefore, we seem justified in considering persons who harbor large numbers of actively hemolytic streptococci in the throat as potential carriers of this disease. The persistence of these human streptococci outside the body in dust, in dried sputum, etc., has not yet been carefully investigated. It is known that they are tenacious of life, however, are resistant to drying and other deleterious influences. The possibility of infection through food should not be disregarded, especially since it is generally held that the epidemics of streptococcus sore throats are spread in this way. In view of the fact which I have previously stated, however, that hemolytic streptococci of the bovine type are very frequently found in milk, great care must be taken to avoid the confusion which may arise by the isolation of these streptococci from milk or milk products and in mistaking them as responsible for the epidemic.

That the infection starts in the respiratory tract and is a descending one seems most probable, since blood infection occurs apparently only late in the disease. Our present knowledge indicates that the infectious agent is spread by fairly direct transfer of the infectious agent from the patient sick of the disease or from healthy carriers, either by droplet infection or by the bacteria carried in particles of dust. In the presence of an epidemic, there can be no question that many healthy carriers exist. The number of these vary under different circumstances, apparently depending on the degree of crowding and close personal contact. The number of healthy carriers of any pathogenic organism is apparently related to the virulence or invasiveness of the given organism and to the prevalence or lack of immunity on the part of the individual coming in contact with the infection. In the case of diphtheria, the wide prevalence of immunity in man offers an explanation for the large number of healthy carriers. At present we have no means of testing immunity to streptococci. The pathology of the disease, however, suggests that the organisms are not highly invasive for man, that they take root and grow in man with difficulty and even when once established they do not intensively invade the human tissues. If such an apparent contradiction of terms is allowable, they are highly fatal to man but not extremely virulent for man.

EPIDEMICS OF MEASLES

There seems little doubt that the present epidemic among the soldiers started with infection of patients suffering from, or convalescent from, measles. This disease seems to render the respiratory mucous membrane especially susceptible to secondary infection, particularly with the streptococcus. Similiar epidemics of this form of infection are not unknown. Indeed, the almost invariable occurrence of pneumonia among children in crowded foundling and orphan asylums, and even in hospitals not conducted with the greatest care, has long been known by pediatricians and public health officials, and has led to the adoption of the general rule that children with measles should be treated in homes rather than in hospitals, even though the home conditions are unsanitary and unsatisfactory. Probably in our army hospitals, at first at least, infection occurred mainly within the hospital itself. Very good evidence of this fact we obtained, first, by studying in one of our army hospitals the prevalence of hemolytic streptococci in the throats of patients admitted to the measles wards, and then later, by observing the appearance of these organisms in the same throats after the patients had been in the wards some days. While on admission only about 11 per cent. of the throats showed the presence of these organisms, after the patients had been in the wards for from eight to fourteen days, between 50 and 60 per cent. of the patients harbored hemolytic streptococci in their throats. At this camp, however, both measles and the bronchopneumonia associated with it, had prevailed for several months before these studies were made. Moreover, in this camp evidence was obtained showing that this streptococcus pulmonary infection was occurring not only in the patients suffering from measles, but that patients with acute lobar pneumonia due to pneumococcus were being secondarily infected with streptococci, and thereby a disease of only moderate severity was changed into one of extreme gravity.

At this camp it did not appear that the disease was occurring primarily, or that healthy individuals were being attacked. Since my return to New York, however, cases have been seen among civilians in which the infection was apparently primary, entirely unassociated with any preceding infection. Dr. MacCallum, who was associated with me in the previous studies I have mentioned, has lately studied an epidemic in another camp and in a report not yet published states that in most of the cases seen there, no association with measles could be discovered. In a report which has just appeared by Fox and Hamburger from Camp Zachary Taylor, these writers are inclined to consider the two epidemics, that of measles and that of streptococcus bronchopneumonia, as occurring coincidently but more or less independently. Nevertheless, it seems probable that, without the extensive occurrence of measles, the streptococcus pulmonary infections would never have reached the widespread prevalence they have obtained. Even with the risk of indulging in unwarranted theorizing, I cannot help suggesting that the epidemic started as a streptococcus infection in the respiratory mucous membrane of measles patients. The streptococci, rapidly increasing in virulence, were then able to attack patients suffering from other respiratory diseases such as lobar pneumonia; and finally the streptococci have acquired such virulence that now even healthy persons may be infected. The conditions are not at all unlike those obtaining in epidemics of septic wound infection and puerperal fever as formerly seen in hospitals, in which at times there occurred a rapid increase in virulence of the infecting streptococci, with resulting sudden and widespread prevalence of this type of infection.

MEASURES TO PREVENT INFECTION

While our knowledge is far from sufficient to permit dogmatic statement, it seems probable that the efforts to prevent and to limit this disease should consist, first, in the institution of special precautionary measures to prevent the infection of those persons in whom a high degree of susceptibility exists, especially patients with measles, lobar pneumonia and other respiratory infections; and second, since the streptococci are present in greatest numbers and are most virulent in patients already suffering from the disease, in endeavoring to obtain an etiologic diagnosis in these patients at the earliest possible moment, and in isolating them as rigidly as possible. A third measure which would be of the greatest value, just as it has

proved to be in the prevention of typhoid fever, and may be in the prevention of lobar pneumonia, is preventive inoculation. In the case of streptococcus, this is apparently not so simple as it might appear at first sight. Little is known concerning immunity to streptococci, and this little indicates that this immunity is much more difficult to induce artificially than is immunity to pneumococcus, for instance. It is not at all impossible, however, that with further investigation, proper methods for producing this immunity may be discovered. Finally, the detection and the isolation of healthy carriers, while theoretically of great importance, seem at present impossible and impracticable tasks. By avoiding crowding and by inculcating in the men by education a sense of propriety in caring for their nasal and oral secretions, just as they have been taught not to distribute feces and urine indiscriminately, much may be done to lessen the danger of the healthy carrier. Convalescents from the disease probably carry streptococci of high virulence and are therefore of great danger. Isolation of such persons until examination of the throat shows great freedom from these organisms should not be impossible. Protection of the soldier from influences which may lower his general resistance, such as exposure and undue fatigue, at least during the early period of training, is also undoubtedly of importance.

Emphasis should be laid on the matter of early diagnosis and especially the matter of proper isolation of cases of infectious disease, since these measures, as I have indicated, are essential for the prevention of the disease under discussion, as well as of all other communicable, acute, infectious diseases. For these measures to be carried out there are three essentials: first, knowledge by the surgeons of the early signs and symptoms in those diseases in which diagnosis is made by these features alone, notably the exanthemata; second, well-equipped laboratories in which etiologic diagnoses may be properly made (this applies especially to pneumonia and to diseases like diphtheria); third, properly organized infectious disease hospitals. It is not as well recognized as it should be that an infectious disease hospital requires a special organization, quite different from that of the general hospital. The great majority of medical patients treated in the camp hospitals are suffering from infectious and contagious diseases. These patients cannot be properly isolated in a general hospital. Therefore every camp hospital should consist of two divisions, one for infectious diseases and one for noninfectious diseases. Patients for admission to the former should be kept entirely separated from those to be admitted to the latter.

The personnel of the infectious disease hospital should be distinct from that of the general hospital. The infectious disease hospital should be supplied with separate receiving rooms, should have observation wards with individual rooms for patients, and should have a group of wards for each infectious disease. With a well and specially trained head and an intelligent staff, the spread of infections in such a hospital could be prevented. All pneumonia cases, those due to pneumococcus as well as those due to streptococcus, should be treated in such a hospital. So far as possible, patients suffering from pneumonia due to the different types of pneumococci should be treated in different wards. Patients suffering from streptococcus infections should be rigidly isolated. Measles and pneumonia patients having hemolytic streptococci in their throats should not be placed in the same wards or rooms with those not carrying such organisms.

All this may sound utopian and fanciful to some of you, who will therefore be surprised to hear that these measures are already being carried out, at least in a somewhat modified form, in more than one camp. In one camp where the measles cases carrying streptococci have been carefully isolated from the so-called "clean measles cases," complications among the latter have been practically eliminated.

CONCLUSION

I should like to emphasize the fact that acute lobar pneumonia is an endemic disease, while streptococcus bronchopneumonia occurs chiefly in epidemic form. The reason for this is that streptococci are extremely variable in their pathogenic properties. Dr. Theobald Smith has drawn attention to the fact that streptococcus infections in animals are not self-perpetuating. They occur as epidemics, mainly as secondary, not primary infections. This is also true in man. A suitable soil is necessary. Given this, streptococci rapidly gain in virulence. Every new case of infection adds not only to the extent but also to the intensity of the epidemic. In streptococcus pneumonia, the epidemic of measles provides the proper soil. Measles in the army probably cannot be prevented. It is possible, however, that in any one place, the number of cases occurring at one time may be limited. Finally, the time to stop streptococcus bronchopneumonia is at the beginning of the epidemic. Later, this becomes extremely difficult. By the introduction, early in the epidemic, of measures such as I have mentioned, much may undoubtedly be done to lessen the incidence of this serious disease.

CONTROL OF MENINGITIS*

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Fortunately the problem presented by meningitis among our armed forces during the past winter has been smaller than that relating to pneumonia. But the conditions were not without their own degree of seriousness. At this moment we are facing the assembling of another large body of troops, and possibly the assembling may be repeated many times before the war is brought to an end.

Hence we shall doubtless find ourselves in the situation of having perpetually to guard against the prevalence of epidemic meningitis on a larger or smaller scale. Fortunately, we are in a favorable position with reference to that disease, since we know its bacterial cause and its mode of infection, and possess adequate methods of detecting the meningococcus.

There may be differences of opinion as to just what part the ordinary healthy carrier of the meningococcus plays in initiating an outbreak of meningitis, but no one disputes the fact that without carriers of meningococcus, either healthy or sick, there could be no spread of disease.

From this, it seems obvious that we command as many of the factors controlling the disease as possible. The meningococcus is, of course, the essential and

* Read before the Section on Preventive Medicine and Public Health at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

central factor; but without doubt, subsidiary factors play important parts. Among the latter would appear to be excessive fatigue and concurrent respiratory infections of slighter degree, such as colds. That the unusual conditions surrounding the military life exert an influence at the outset is indicated by the circumstance that it is the fresh recruit and not the seasoned soldier who especially suffers from epidemic meningitis.

The source of meningitis in the Army and Navy is, in the first instance, the civilian population. Because healthy carriers of the meningococcus exist there, they have been introduced among the troops. Once there, they are menacing, apparently, according to fluctuating circumstances.

If we disregard, for the sake of our argument, the secondary factors that bear on the induction of infection, and concentrate attention on the meningococcus itself, two essential facts appear: first, that numbers of meningococci thrown off with the nasopharyngeal secretion, and second, that the bacteriologic type or variety of the organism play a large part in determining the result. Thus the healthy carrier who harbors many meningococci in his nasopharynx is relatively a much greater potential menace than the one who harbors few; and some types or varieties of meningococci are more pathogenic than others.

There is universal agreement among bacteriologists that the meningococci compose a complex group rather than a single, fixed type of micro-organisms. Recent studies also indicate that this group contains two immunologic varieties (so-called types) of meningococci which are responsible for from 75 to 80 per cent. of all cases of epidemic meningitis. The remainder of the cases are produced by meningococci of less fixed qualities and of less parasitic properties.

Studies of the meningococci among the general civilian population and military personnel, under conditions in which cases of meningitis are not frequent, show that the healthy carriers tend to harbor not the highly parasitic, but rather the less pathogenic varieties of meningococci. Once cases become frequent, however, the number of healthy carriers of the parasitic kind rises.

We are permitted, therefore, to view, tentatively at least, the class of meningococci somewhat as we now view the pneumococci. We distinguish among the latter parasitic and saprophytic varieties or types. The miscellaneous pneumococci composing the so-called Type IV group, notwithstanding the fact that certain ones may occasionally cause pneumonia, are still regarded as saprophytes and as practically always present in the mouths of a high percentage of normal persons. Similarly it may well be that normal persons not very infrequently carry the more saprophytic forms of the meningococcus.

Should we therefore proceed in the case of meningococcus as we have in that of pneumococcus, we should regard as menacing only the carriers of the parasitic varieties. Now, since in all our operations to conserve the health of our troops we must take into account the military exigencies, a distinction between dangerous and less dangerous meningococci would materially affect our practice of segregating meningococcus carriers and withdrawing them from active military training.

This distinction in types may now be readily made on the basis of specific agglutination with monovalent immune serums derived from rabbits. The subject, as I have outlined it, is in its early stages. It is to be hoped that the experience of last winter in the Army and the Navy and the intrinsic importance of the matter will lead to a critical study of the meningococcus carrier problem from this point of view, in the hope and expectation that the control of epidemic meningitis may be made thereby simpler, more effective, and less disturbing to the training of our troops.

AN EXPERIMENTAL STUDY OF PAROTITIS *

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The subject of the etiology of parotitis has been investigated from a bacteriologic standpoint, and cocci have been isolated from the blood, saliva, and fluid aspirated from the swollen parotid gland.[1] Attempts to reproduce parotitis in animals by the inoculation of such cocci proved entirely unsuccessful, showing that these earlier studies had not solved the problem of the etiology of mumps. The cocci are probably contaminations. In 1908, Granata[2] first used saliva filtrate from parotitis patients for animal inoculation, suggesting that the virus of parotitis may be a filterable one. Since then investigators have tried to reproduce the disease in laboratory animals rather than to isolate a bacterium from human patients. Granata worked with rabbits; Gordon[3] inoculated monkeys intracerebrally. Nicolle and Conseil[4] injected material into the parotid glands of monkeys. The results of all these investigations were only suggestive as far as the reproduction of mumps in animals is concerned, and Gordon's attempts to transfer the disease from one monkey to another proved entirely unsuccessful.

Three years ago material was obtained in the following way from a number of children acutely ill with parotitis: The patients were allowed to rinse the mouth with sterile physiologic sodium chlorid solution, and the washings were filtered through a new Berkefeld candle N. The resulting filtrates were proved sterile by aerobic and anaerobic culture methods and were injected into the parotid glands and testes of healthy, half grown cats. During the past winter the prevalence of parotitis in Army camps near New York City provided the opportunity for repeating the work with material from adult (soldier) patients.[5]

EXPERIMENTAL

Cats were selected as the experimental animals because they are known to be subject to attacks of parotitis and it might reasonably be inferred, therefore, that they are not possessed of a natural immunity to the disease. Old cats proved unsuitable because the thick connective tissue on the side of the face over the parotids makes inoculation difficult, and such old

* From the Laboratories of the Rockefeller Institute for Medical Research.
* Read before the Section on Preventive Medicine and Public Health at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Laveran and Catrin: Compt. rend. Soc. de biol., 1893, **5**, 528. Busquet: Rev. de méd., 1896, **16**, 744. Tessier, P., and Esmein, C.: Compt. rend. Soc. de biol., 1906, **58**, Pt. 1, pp. 803, 853. Mecray and Walsh: Med. Rec., New York, 1896, **50**, 440.
2. Granata, S.: Med. ital., 1908, **6**, 647-672.
3. Gordon, M. H.: Report to the Local Government Board on Public Health and Medical Subjects, London, 1914, N. S., No. 96.
4. Nicolle, C., and Conseil, E.: Compt. rend. Acad. d. sc., 1913, **157**, 340.
5. I am indebted to Captain Meader for the privilege of obtaining material at Camp Mills; and to Captain Monaghan for many courtesies at the Army Hospital at Secaucus, N. J.

animals do not react well. Before anesthesia the temperature of the cats was recorded and the leukocytes counted and differentiated. The skin over the parotid and testis to be inoculated was denuded of hair and carefully cleansed. Injection with a new, sharp needle is not difficult. The parotid can be picked up between the point of the needle and the left index finger, and from 1 to 2 c.c. readily injected.

The animals recovered rapidly from the ether and showed no ill effects from the inoculations. The following day the temperature had usually risen 0.5 C., but the white blood cells had not increased in number. There was, as a rule, slight tenderness in the inoculated testicle, and often in the parotid as well. This was evidently of mechanical and not of inflammatory origin and always disappeared within another twenty-four hours, leaving the cats apparently well on the second day, although the temperature was from 0.5 to 0.8 C. above normal. After six or seven days tenderness returned in the testis, accompanied by swelling, and similar symptoms appeared in the parotid. An increase in the leukocytes became apparent two days after inoculation and reached the maximum in about seven to fourteen days, coinciding with the height of the fever. The swelling and pain in the parotid lasted from two to five days, but the testicular swelling rarely subsided in less than ten to fourteen days. In the third week all the symptoms began to disappear, the leukocytes reaching the normal first, the tenderness disappearing at the same time, and the fever persisting for another week. While tenderness on palpation of the parotids was less marked than that of the testes, and the swelling never reached the stage of marked facial asymmetry, the cats manifested some degree of discomfort in the inoculated parotid. The appetite was only slightly affected, and at no period of the experiments did the cats seem especially ill. The disease was not fatal in any instance. Animals killed late in the second or early in the third week showed swelling of the inoculated parotid as well as of the other salivary glands and the neighboring lymph nodes.

The salivary filtrates from patients ill from one to three days produced these marked symptoms in the inoculated cats (Fig. 1). On the sixth day of the disease the effect of the filtrate injection was much less marked, and inoculation of material obtained from a patient nine days or longer after onset of the mumps attack was apparently without result: that is, the cats showed a temperature range of only 0.5 C., the leukocytes were not even doubled in number, and the mononuclear cells were not increased, but the polymorphonuclears were. At necropsy the parotid and the adjacent salivary glands and lymph nodes showed neither gross nor microscopic changes. It would seem, therefore, that the infective period of the mouth secretions from parotitis is comparatively short, lasting about a week and corresponding to the period of swelling of the parotid gland. A fresh swelling appearing in the opposite parotid gland would naturally prolong the infectious period for a given patient.

TRANSMISSION FROM CAT TO CAT

Transmission from cat to cat was accomplished in two ways: by means of the saliva of the inoculated cats, and with emulsions made from the inoculated glands.

By anesthetizing the animals, large amounts of ropy saliva were obtained, and at the height of the symptoms, at the end of the second week after inoculation, the cats were found to harbor in their mouth sufficient virus to produce active symptoms in normal cats. Salivary secretions from normal cats were used as controls and gave only negative results, just as did normal saliva from healthy human beings.

Emulsions from the inoculated glands were made by grinding the organs in a small, tissue-grinding machine, through whose fine wire screen from 0.2 to 0.3 c.c. of finely divided material passed. The best time for the reinoculation was found to be from the fourteenth to the seventeenth day, when the testicular swelling, the leukocytosis and the fever were highest. During the first seven to ten days, transfers were less uniformly successful. Evidently the reaction requires about two weeks for its maximum development. Atrophy of the inoculated testicle occurred in several cats, after the acute symptoms had abated.

After the third or fourth transfers, the reaction developed more rapidly and the effects were more severe. But after the sixth or seventh transfers, the reaction perceptibly declined.

These experiments were controlled with extracts prepared from the parotid glands and testicles of normal cats. The inoculation of such normal extracts was followed by a slight rise in temperature lasting only two days, and a polymorphonuclear leukocytosis of the same duration. No enlargement nor tenderness developed in the inoculated glands and at necropsy no changes were demonstrable in them.

PATHOLOGY

1. *Gross Appearance.*—(*a*) Parotid Gland: The inoculated parotid was deeper pink and larger than the uninoculated gland. This difference was often striking. It was also more moist than the uninoculated side and showed on section a granular appearance due to swelling of the acini. The submaxillary and the sublingual glands, as well as the adjacent lymph nodes, were congested and distinctly enlarged. The molar gland, lying just beneath the skin at the angle of the mouth and extending along the lower lip, was uniformly congested and swollen on the inoculated side. During life the buccal mucosa over the gland was distinctly reddened. This symptom could be found in the cat's mouth in four or five days after inoculation. The opening of the duct leading from the injected parotid was always surrounded by a small zone of congestion.

(*b*) Lymph Nodes: The lymph nodes on both sides were decidedly swollen and moist, especially the two nodes close to the anterior border of the parotid. The smaller nodes along the posterior border were usually more swollen on the inoculated than on the uninoculated side.

(*c*) Testis: The inoculated testis was larger than the uninoculated, but unchanged in color. On section the cut surface was more gray, cloudy and moist. In a few instances the point of inoculation was visible as a small dark spot, but otherwise no focal changes were noted.

2. *Microscopic Appearance.*—(*a*) Parotid: The histologic changes present in the parotid were usually inconspicuous in the first transfer, and consisted only of congestion of the vessels and swelling of the epithelium of the acini, with edema of the interlobular connective tissue. These are the changes that have been described in the pathology of human mumps.

In the third and fourth transfers, the glands often showed infiltration of the interlobular connective tissue, with mononuclear and a few polymorphonuclear cells in addition to the edema. The infiltration was most intense about the secretory ducts, which were sometimes dilated (Fig. 2). The epithelium of the acini was swollen and cloudy in some instances. The areas of cellular infiltration were more pronounced in some parts of the gland than in others, were always multiple, and could be easily differentiated from the small lymph nodes normally present between the lobules.

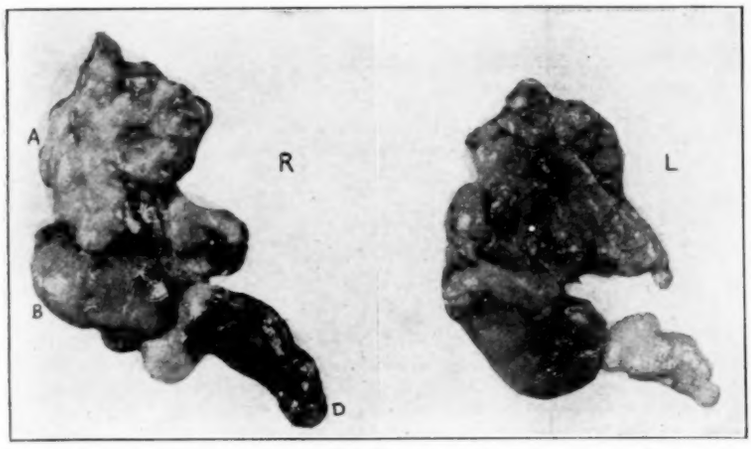

Fig. 1.—Parotid, submaxillary and sublingual glands and adjacent lymph nodes showing swelling of the inoculated (right) side; cat killed after seventeen days: *R*, right; *L*, left; *A*, parotid gland; *B*, submaxillary gland; *D*, lymph nodes.

(*b*) Testis: The histologic changes in the testis were more constant than those in the parotid, and more pronounced in the epithelium than in the supporting framework of the gland. The layer of cells next to the basement membrane of the tubules tended to be normal in appearance, but the rest of the cells were often the seat of a change resulting in a diminution in the number of spermatocytes and consequently of the mitotic nuclei normally found. The spermatids were still more altered, showing as the remains of their nuclei irregular and deeply staining granules, while the cell bodies stained poorly or had undergone extensive lysis. As would be expected, spermatozoa were diminished in number, and few were normal in appearance, their broken-up condition being easily discernible. Epithelial changes of some degree were present in some part of practically all the inoculated testicles. Interstitial cellular infiltration, on the other hand, occurred far less frequently in the testicle than in the parotid gland. Another striking change in the testis was noted in the interstitial cells. These were larger than normal, and, in several instances, actually increased in number, forming large masses between the tubules.

(*c*) Lymph Nodes: On microscopic examination, the swollen lymph nodes showed necrosis of the center of several lymph nodules, while the sinuses were distended and the lining cells swollen.

BLOOD CHANGES

1. *Leukocytes.*—The average number of leukocytes in the normal cat was found to be from 16,000 to 20,000, and a daily variation of 5,000 not an unusual event; consequently, only decided increases can be of significance. In the inoculated animals the white cells began to increase within the first forty-eight hours, while on the seventh and eighth days a sudden additional rise, often doubling the initial count, may occur. The increase is maintained, with daily fluctuations, for a period of from eight to ten days, the maximum being reached on about the fourteenth to the sixteenth day. The fall takes place gradually, the initial number being reached, as a rule, in about four weeks. During the first two weeks the leukocytosis is polymorphonuclear in character. At the end of the second or beginning of the third week, when the fever and glandular swellings are at the highest, a lymphocytosis is noted. The large mononuclear and eosinophil cells remained practically unchanged throughout.

The blood picture as described in the experiments is not dissimilar from the one observed in cases of parotitis in man with testicular complications. The increase in mononuclear cells found by Nicolle and Conseil[4] in one of their monkeys, which had been inoculated into the parotid but not into the testicle, is of some interest in this connection, as is the polymorphonuclear leukocytosis without the later appearance of a lymphocytosis noted in cats inoculated intratesticularly with material from normal cats, as controls; that is, the characteristic thing in the blood picture during parotitis is a mononuclear cell increase.

2. *Virus Content.*—The marked constitutional symptoms noted in many parotitis patients suggested an investigation of the blood at the height of an attack.

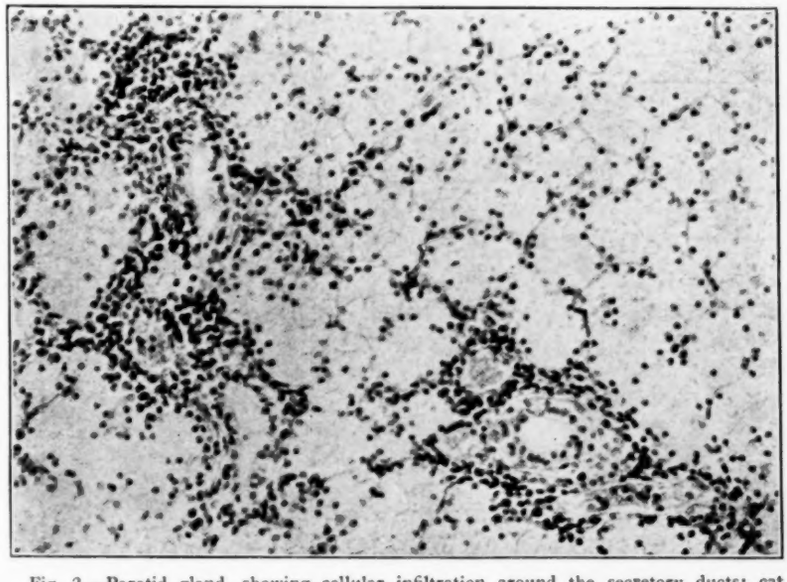

Fig. 2.—Parotid gland, showing cellular infiltration around the secretory ducts; cat killed after eighteen days.

Films were found to be negative for parasites and bacteria, and cultures made both aerobically and anaerobically remained sterile. Blood was taken from a vein at the elbow in seven patients ill from two to three days. All showed marked constitutional symptoms. The blood was defibrinated, proved to be sterile, and then inoculated into normal cats. Control animals were inoculated with

blood from a normal adult. The results were interesting. While the temperature range was not high, it was least high in the controls. The blood count, on the other hand, showed a polymorphonuclear leukocytosis in both sets of animals; but while the mononuclear cells were diminished in the control cats, they were actually increased throughout in the animals receiving the blood from the patient ill of parotitis. The blood taken from a case with slight symptoms on the fifth day of illness gave no result on injection into a cat.

The conclusion drawn from these experiments is that the blood of parotitis patients, especially when suffering from severe constitutional symptoms, is infective for cats. This conclusion is in keeping with the clinical course and metastatic complications of certain cases. Figure 3 shows the swollen glands in a cat inoculated with the blood of a patient.

PROTECTION EXPERIMENTS

Results suggesting that protective substances may be developed by the cats after they have passed through a typical attack of experimental parotitis were obtained in two ways: 1. Animals were reinoculated from one to four months after the first inoculation and failed to develop the typical symptoms they had previously exhibited. 2. As was to be expected from the results of these reinoculation experiments, the serum from recovered cats had the power to reduce the development of the reaction caused by the injection of the virus of parotitis when left in contact with it at 37 C. for two hours. Animals inoculated with such a serum-virus mixture failed to develop the typical symptoms or lesions produced by the virus alone or by virus treated with normal cat serum.

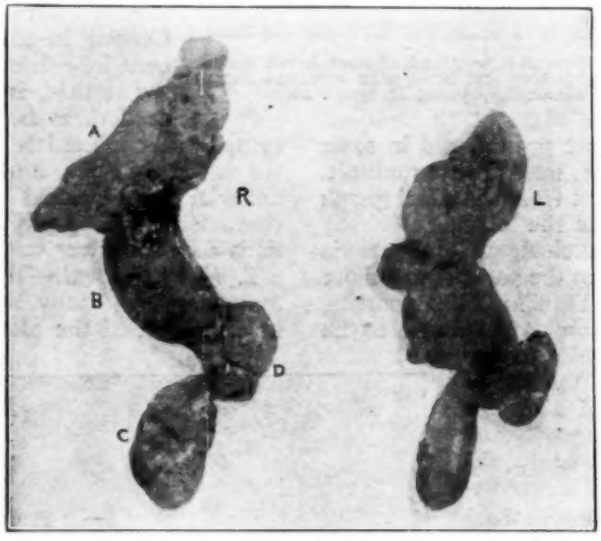

Fig. 3.—Parotid, submaxillary and sublingual glands and adjacent lymph nodes, showing swelling of the right side inoculated with blood from a patient ill three days; cat killed after seventeen days: *R*, right; *L*, left; *A*, parotid gland; *B*, submaxillary gland; *C*, sublingual gland; *D*, lymph nodes.

RECURRENT CASE

An interesting recurrent case occurred in a soldier. His first attack of mumps began in November, 1917, and he had three recurrences, the last one early in May, 1918. March 13 and again, May 1, his filtered saliva was injected into a cat, with positive results. Figure 4 illustrates the lesion caused by the filtrate of his saliva during the second recurrence. May 15, the mouth secretions were found to be negative and the facial swelling had disappeared. Jochmann[6] says that the swelling of the parotid may remain for months or even a year. The lesion in this soldier lasted for a period of five and a half months, and his saliva was infectious for that period.

SUMMARY

Cats injected into the parotid gland and testicle with a bacterial sterile filtrate of the salivary secretion of children and adults in the active stage of parotitis or mumps develop a pathologic condition resembling the condition present in mumps in human beings.

After an incubation stage of from five to eight days, definite changes have been noted in the temperature, blood leukocytes, and inoculated organs.

The rise of temperature and the leukocytosis precede the glandular swelling, but all the changes reach the maximum at about the same time, after which they decline, and normal conditions are reestablished in about four weeks.

The intraparotid and intratesticular injections of extracts of normal parotid gland and testicles may cause a mild rise of temperature and leukocytosis of brief duration, but swelling and tenderness are absent. The white cells increased are the polymorphonuclears and not the lymphocytes. The injection of filtrates of normal saliva causes only a mild and brief rise of temperature, but no leukocytosis nor swelling of the glands.

The saliva of man and of inoculated cats as well as the inoculated glands of the latter animals were found to contain the filterable infective agent.

The virus of parotitis is most readily detected in the saliva during the first three days of the disease, less readily on the sixth day, and not at all after the ninth day. This would have a practical bearing on the question of infectivity and length of isolation period for mumps patients.

The virus was also detected in the blood of patients showing marked constitutional symptoms.

The serum of recovered cats was found to contain an immune body which diminished or even neutralized the action of the virus of parotitis.

6. Jochmann, G.: Lehrbuch der Infektionskrankheiten, Berlin, 1914.

ABSTRACT OF DISCUSSION

Col. Frederick F. Russell, Washington, D. C.: It is apparent from these charts that the respiratory infections run similar curves and that in general city populations are immune and country populations are not immune; that the spread of measles, particularly, seems bound to take place when the men are brought together. If measles does not appear early, it will probably occur later, when the troops are crowded. We must remember that they are going to be crowded on the way across the Atlantic and on the other side; that there will be less air space per man over there than there is here in our own camps. As it seems almost inevitable that the men will have measles, it is better for them to have the disease under the best circumstances. The immunity that the city troops have to all the respiratory infections gives a hint of the remedy needed to make country troops equal to city troops. The diseases for which we have good vaccines have not appeared on these charts, and this again shows the importance of an active immunity against acute respiratory infections.

These are the causes of death—pneumonia, meningitis, traumatisms, tuberculosis, measles, scarlet fever, diphtheria, typhoid and paratyphoid. Smallpox is not even on the chart, so it is apparent that these diseases, for which we have pretty good protection, are not important. It is measles, meningitis

and pneumonia of various kinds that cause the great mortality. We have now a new incentive to look for some way of producing artificial immunity against these diseases. So far as lobar pneumonia is concerned, it seems probable, from the work of Lister in South Africa and Cole in New York, that we have a vaccine which promises good protection against lobar pneumonia. Unfortunately, there is nothing very promising for these other infectious diseases, but it seems apparent that in order for us to have seasoned troops we have got to have immune troops, either immune as the result of naturally acquired disease or immune as the result of some sort of vaccination.

DR. WILLIAM C. RUCKER, U. S. Public Health Service, Washington, D. C.: I have just returned from France, where, under the direction of the Chief Surgeon of the American Expeditionary Forces, an investigation was made relative to the sanitation of the troops in transport. I am not at liberty to give you the accurate data regarding the findings because to do so would be to disclose the number of troops that have moved and the ports by which they entered Europe. In one instance of a single convoy, on which there were not quite 14,000 troops, the time of the voyage was fourteen days. Of these troops thirteen men died before shore was reached. Of these thirteen deaths nine were due to pneumonia, three to acute tuberculosis and one to acute cardiac dilatation. There were 235 admissions to the sick bay during the fourteen-day voyage, of which 114 were discharged to the hospital when the troops were disembarked. The remainder were either returned to duty or were among the thirteen who died. There were forty-four cases of pneumonia; I forget the number of cases of mumps, but there were a considerably greater number of cases of mumps, and when we exclude the venereal diseases, there was only one case, a case of acute cardiac dilatation, which was not a sputum-borne disease. The greatest number of admissions to the sick bay was on the sixth day of the voyage. From that I think it is pretty safe to assume that the infections were acquired prior to embarkation. The sanitary condition of the vessels was excellent in every case The Navy has handled that end of the work remarkably well, and in no case was there infection which was traceable to the ship itself. We have control of the fecal-borne infections and we must focus our attention in the future more on the sputum-borne infections. The best way to accomplish this, so far as transportation is concerned, is to quarantine troops very carefully and to repeatedly examine them prior to embarkation, so that the sick man may not be shipped to Europe. The Surgeon-General's Office has handled this end of the problem remarkably well. There are some faults in the system at the present time, but they are not the faults of the medical department.

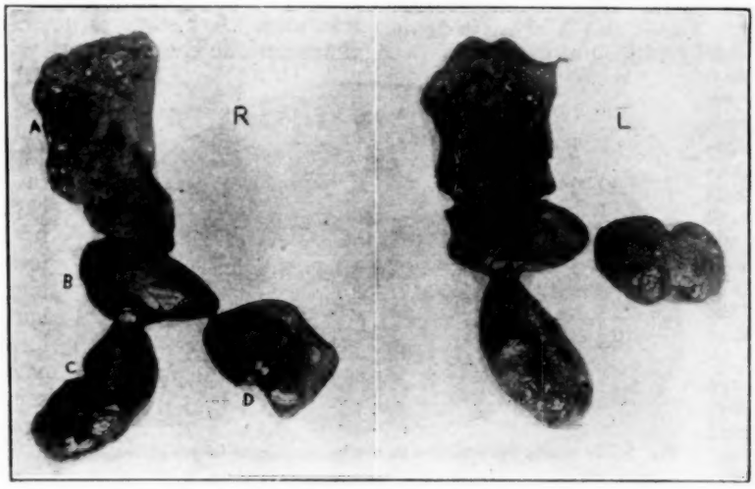

Fig. 4.—Parotid submaxillary and sublingual glands and adjacent lymph nodes, showing swelling of the right side inoculated with saliva filtrate from a recurrent case; cat killed after fifteen days: *R*, right; *L*, left; *A*, parotid gland; *B*, submaxillary gland; *C*, sublingual gland; *D*, lymph nodes.

COL. V. C. VAUGHAN, Washington, D. C.: I made a study of pneumonia and other communicable diseases in the camps during the six months from October 1 to March 31 and found that there are great differences in morbidity and mortality rates in the different camps. The healthiest camp was that of the Illinois National Guard, located at Houston, Texas. The death rate in this division was in round numbers one-half the death rate in the same age group in Chicago for the same time. The healthiest camps were located in the South and were occupied by northern troops. The next healthiest troops were northern soldiers in northern camps. The highest death rates were found with southern troops in southern camps. There were three camps with a death rate above 24 per thousand, and deaths were mostly due to pneumonia. These camps were Pike in Arkansas, Beauregard in Louisiana and Wheeler in Georgia, all occupied principally by southern troops. When we take a map and place the camps not where they are, but in the center of the area from which the troops came, we find that all the good camps are in one area, and that area is the northern part of the United States, east of the Mississippi River. It appears, therefore, that the prevalence of pneumonia depends on the susceptibility of the individual, and that southern soldiers are much more susceptible than their northern comrades. This was true in the Civil War, and apparently continues up to the present time.

The Surgeon-General himself having had large experience with pneumonia both on the Panama Canal zone and in South America, recognized the fact that the respiratory diseases would be those with which we would have to contend, and in order to limit the spread of these diseases, he insisted on proper floor space in barracks. It has developed that when we speak of crowding in our Army camps, we are prone to think only of sleeping quarters. Crowding in camps occurs more frequently and more dangerously in waking hours than it does in sleeping hours. When men gather around the stove in barracks or when they go to a place of amusement or instruction, there is the greatest and most dangerous crowding. Major Soper has figured out that at Oglethorpe, in a large amusement hall, when it is filled, if every man sits perfectly upright and does not move his head one way or the other, the greatest possible distance between one man's nose and that of another man on the same row would be 16 inches, and that on the rows in front and behind would be 26 inches. When one leans over and coughs, and when you think of 9,000 men sitting in such a hall and two thirds of them cough at once, you can see what it means.

So far as I know, in only one camp has there been any careful examination for malaria, and the percentage found in that camp was less than two. Of course, this does not prove that only 2 per cent. of the soldiers in this camp had malaria or had ever had this disease. At Bowie, in Texas, a thorough examination was made for hookworm, and about 12 per cent. of the soldiers were found to be infected. It seems from these figures that neither hookworm nor malaria has existed in the southern camps to the extent generally supposed.

DR. H. GIDEON WELLS, Chicago: We have heard something about the situation as to cholera on the Macedonian front. It may be interesting to mention the Roumanian front on the opposite side of Belgium. At the time of the retreat of the Roumanians into Moldavia there was suddenly crowded there a double population, with few roofs to cover them and very little food. Consequently, the population was moving as rapidly as possible and as freely as possible to get food and shelter. Cholera immediately broke out and, under these conditions, at once spread widely, with no possible means of preventing it by quarantine. Professor Cantacuzene of the University of Bucharest had brought out their bacteriologic laboratory equipment on cars. They at once established as

near universal vaccination as possible. There was absolutely no other way to interfere with the spread of cholera, yet there was practically not a case remaining in less than two months. Last summer, at certain of the camps, all the men passing through these stations were examined as to the existence of cholera carriers, and there were no cases to be found among these troops, showing how efficient cholera vaccination is by itself, even in the absence of proper quarantine and sanitation.

DR. PAUL ARMAND-DELILLE, France: Our French laboratories had the same experience. There were some cases in the civilian population, and in Corfu they used the same method, vaccination, and stopped the epidemic.

DR. SIMON FLEXNER, New York: I was asked to touch on the point of the extent to which examination should be made in the search for meningococcus carriers. In the first place, I should say that whole commands should not be swabbed. Even assuming the operation practical, it would not be justified. I approve the plan outlined in the leaflet of information of meningitis issued by the Surgeon-General of the Army, in which the Navy concurs. This plan is based on wide experience. Briefly, it consists in swabbing first the close associates of the case of meningitis, and later extending and widening the circle according to circumstances—that is, whether more cases arise or not. Two advantages are obtained by this procedure: disorganization of the military personnel is avoided, and the carrier work is done more thoroughly and with greater finality. To attempt to swab organizations larger than the laboratory force can handle well is either to invite inaccurate reports or to compel repetition of the work.

COL. FREDERICK F. RUSSELL, Washington: There was one point about the carrier work which has been done on meningitis which shows in the survey of all the camps, and that is that where the carrier work was done thoroughly at the beginning the disease never became widespread, nor has it persisted. In some of the camps, where for one reason or another it was impossible to get the carrier work started early until the cocci and the infection were widespread through the camp, we have not been able to get the rate down, and at the end of the year we find certain camps have had a much higher number of cases than other camps, and they are the camps which were late in getting to work on the carrier problem.

DR. RUFUS COLE, New York: It is remarkable that there has been little or no pneumonia among English and British troops. The factors on which this freedom from pneumonia depends is still somewhat obscure. Dr. Vaughan has brought out the extremely important fact that racial or geographic immunity does really exist entirely apart from other conditions, such as climatic or hygienic ones. However, there are two main factors to be considered in infections Individual resistance is one of these factors, but the virulence or invasiveness of the infectious agent is also of significance.

Monkey Bone Grafts.—Küttner recently reported in the *Münchener medizinische Wochenschrift*, 1917, No. 45, the present status of two children who had had the lacking fibula or radius replaced with the corresponding bone from a young macacus monkey. The children were 9 months and nearly 2 years old at the time, and the interval since has been six and four years. The roentgenograms show that the bones have grown solidly in place but there has been no growth in length. This experience shows that living bone is available in this way for implants, and that possibly whole joints, tendons and vessels from apes and monkeys might be utilized, but Küttner doubts whether monkey nerve tissue would ever be suitable for grafting. (From an abstract in the *Nederlandsch Tijdschrift.*)

CHANGES IN THE BRAIN IN GAS (CARBON MONOXID) POISONING *

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AND
C. B. SEMERAK, M.D.
CHICAGO

This subject is important for three reasons:

1. Carbon monoxid is liberated by bursting shells and therefore is one of the gases responsible for mortality in the present war.

2. Deaths, accidental and suicidal, from inhalation of illuminating gas are increasingly frequent in civil life.[1] Henderson[2] states that carbon monoxid causes more deaths than all other gases combined. There is a reason to believe that a higher carbon monoxid content in illuminating gas is in part responsible for this. Statistics of certain cities of Great Britain[3] indicate that the higher percentage of such deaths parallels the greater proportion of water gas used in the manufacture of a cheaper product.

3. Carbon monoxid poisoning is of medicolegal significance. A history is not always available, and the characteristic cherry-red color of the blood and chemical proof of carbon monoxid are aids to diagnosis only in the first few days after poisoning. Kolisko[4] in 1914 maintained that carbon monoxid produces invariably a characteristic lesion in the brain, namely, bilateral softening of the lenticular nucleus. We have attempted to discover whether this observation can be confirmed.

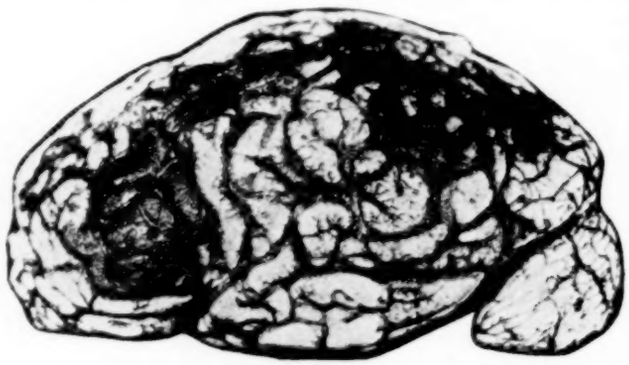

Fig. 1—Extensive hemorrhages in the leptomeninges in gas poisoning.

The present study consists of the examination of thirty-two brains obtained from the postmortem rooms of the Cook County Hospital. In every case the clinical record and complete necropsy report have been available for correlation with the pathologic condition found in the brain. The fresh brains were described on removal, hardened in 10 per cent. dilution of solution of formaldehyd, and again described. Thin cross-sections made by cutting the brain transversely at right angles to the anteroposterior axis were then described. Blocks were removed regularly, including the leptomeninges and cortex from the lateral surface of the hemispheres, corona radiata, centrum semiovale, corpus callosum, lenticular nucleus and internal capsule, pons, medulla and cerebellum. Other areas were selected where gross changes were evident. The blocks

* Because of lack of space, this article is abbreviated in THE JOURNAL by omission of the case reports. They will appear in the reprints, a copy of which will be sent by the authors on receipt of a stamped, addressed envelop.

* From the Department of Anatomy, University of Chicago, and the Department of Pathology, Rush Medical College. This study was made under the supervision of Profs. C. J. Herrick and E. R. LeCount. The expenses were defrayed by an appropriation from a fund contributed to the University of Chicago for this purpose by twelve citizens of Chicago through the efforts of Mr. H. S. Hyman, and an appropriation made by the Otho S. A. Sprague Memorial Institute.

1. McNally, W. D.: Carbon Monoxid Poisoning, THE JOURNAL A. M. A., Nov. 10, 1917, p. 1586.
2. Henderson, Yandell: Carbon Monoxid Poisoning, THE JOURNAL A. M. A., Aug. 19, 1916, p. 580.
3. Mott, F. W.: Arch. Neurol., 1907, p. 246.
4. Kolisko, A.: Die symmetrische Encephalomalacie in dem Linsenkern nach CO-Vergiftung: Beitr. z. gerichtl. Med., 1914, **2.**

were dehydrated in gradually increasing strengths of alcohol, beginning with 20 per cent. in order to minimize the shrinkage of the nerve cells, embedded in paraffin and cut in sections varying from 10 to 15 microns in thickness. The stains used were hematoxylin and eosin, phosphotungstic acid hematoxylin, van Gieson's toluidin blue, Mann's methyl blue, Mallory's connective tissue, Weigert's, Marchi's, osmic acid, sudan III, and Ciaccio's.

In such a series of brains, chosen only by the one circumstance that death was due to carbon monoxid poisoning, there were of course many pathologic changes which cannot be attributed to the gas. Thus syphilis, tuberculosis, pleurisy, pneumonia, nephritis and varying degrees of arteriosclerosis were encountered in various organs, and the picture presented by the brain tissues varied greatly according to preexisting diseases. The effort has been made to determine those changes which may be attributed to the constant factor of the carbon monoxid in the circulation.

FINDINGS

Hyperemia of the brain and leptomeninges was observed in twenty-nine cases. No diagnostic importance is attached to this common appearance in brain disease.[5] Hyperemia of other organs than the brain was frequently present.

Edema was observed in twenty-one cases. The brains do not dry rapidly as do normal brains, and when hardened they cut with more resistance. The leptomeninges are cloudy, owing to the precipitate from the edematous fluid.

Internal hydrocephalus was noted in twenty-one cases.

A cherry-red color of the blood was noticed in eleven cases, and a pink hue to the white matter of the brain in five cases. These indications of carbon monoxid in the blood may be confirmed by the spectroscopic examination and by various chemical tests,[6] which depend on the persistence of a red color to the serum or coagulum when carbon monoxid blood is mixed with certain chemicals in contrast to the gray, brown or black color of normal blood similarly treated. Of the eleven cases showing the characteristic color, four patients were found dead and five others died within a few hours of poisoning. When death is delayed for some days, these evidences of carbon monoxid poisoning are usually lacking.[4]

Petechial hemorrhages, especially in the leptomeninges and the white matter, were observed in fifteen brains. Frequently the hemorrhages were so minute that only microscopic examination served to distinguish them from the stippled appearance in cross-sections of hyperemic vessels. The predilection of the white matter rather than the gray is explained by the scant anastomoses in the circulation of the former. The hemorrhages are scattered through the corona radiata and the centrum semiovale, tending to be more numerous in the posterior part of the brain. The pons, medulla and brain stem are usually involved. In only one brain did hemorrhages occur in the corpus callosum. This fact deserves mention because of the statement of Mott that hemorrhages in this location are characteristic of carbon monoxid poisoning. Mott's[7] case was one of gas poisoning in the trenches, the history was lacking, and there is a possibility that some other gas was responsible for death. Moreover, concussion hemorrhage was not excluded. Hoover[8] has found hemorrhages in the corpus callosum in poisoning by phosgen gas ($COCl_2$) but not in carbon monoxid poisoning.

Petechial hemorrhages were not limited to the brain. Fifteen cases exhibited such hemorrhages in numerous mucous and serous membranes throughout the body, as the stomach, bowels, peritoneum, renal pelves, urinary bladder, pleura, pericardium, pharynx and larynx and in the skin. Together with these extensive lesions of many organs besides the brain should be mentioned the occurrence in twenty-one cases of hyperplasia of the lymphoid tissue, including the spleen, thymus and tonsils, and the cervical, lingual, biliary, periaortic and intestinal lymph glands.

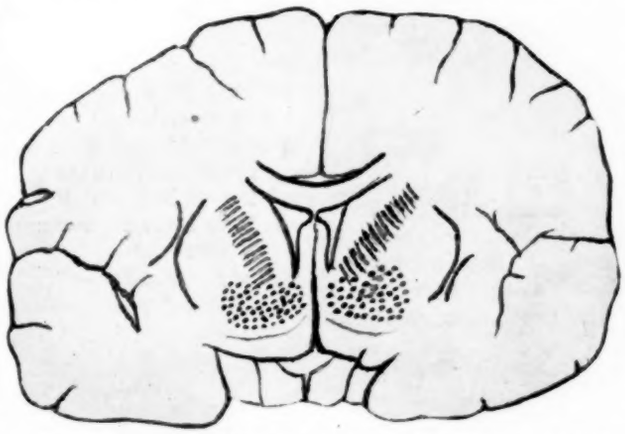

Fig. 2.—Coronal section of a brain, showing the characteristic bilateral softening of the lenticular nucleus in carbon monoxid poisoning; the dotted area represents the softening.

Arteriosclerosis of the cerebral vessels was noted in the majority of the thirty-two cases. In addition to those in which the degree of arteriosclerosis might be considered proportional to age, nineteen brains exhibited degrees of vascular degeneration excessive for their age. Ten of these patients were under 41 years of age.

Bilateral softening of the lenticular nucleus was evident on gross examination in fourteen brains. Microscopic evidence of necrosis in this region was found in each of the remaining eighteen brains. With an overwhelming dosage of gas producing death quickly, especially in young and healthy persons, gross changes may not be present. In older persons with vascular degeneration, the characteristic softening more often occurs. Age, duration of life after poisoning, amount of gas inhaled and preexisting diseases of the brain are factors influencing the amount of damage to the lenticular nucleus. One of these factors may outweigh others.

In the fourteen brains showing softening of the lenticular nucleus, serious pathologic changes due to various diseases were revealed at necropsy in each case. Ten of these persons were above 40 years of age; seven survived three days or longer; four had extensive tuberculosis; six gave evidence of syphilis aside from a degree of arteriosclerosis out of proportion to age in six others; several were chronic alcoholics. In the eighteen brains in which no gross softening of the lenticular nucleus was found, eleven brains were from persons under 40 years of age; thirteen patients died within three days. Of these, three were found dead, seven died within twenty-four

5. Slavik: Etiologie Nahleho Umrti, Prague, 1912.
6. Fishbein, Morris: Illuminating Gas Poisoning, THE JOURNAL A. M. A., March 8, 1913, p. 737.
7. Mott, F. W.: Brit. Med. Jour., 1917, **1**, 637.
8. Hoover: Personal communication to the authors.

hours, and one in forty-eight hours. Postmortem evidence of serious pathologic changes was much less than in the preceding group showing softening in the lenticular nucleus. The globus pallidus was invariably affected. The putamen and internal capsule were affected to a less degree. When gross softening occurred, the putamen and internal capsule were

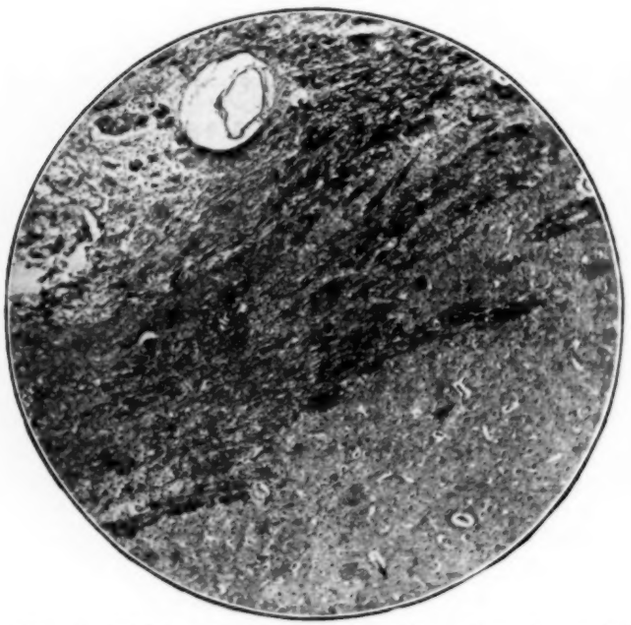

Fig. 3.—Ischemic necrosis in the lenticular nucleus (upper left quadrant).

always included. Three days in solution of formaldehyd is sufficient to bring out the difference between the soft regions and the normal tissue. In extreme cases a slushy mass occupied the position of the lenticular nucleus.

Microscopic examination confirmed the gross appearance of hyperemia, edema, capillary hemorrhages and necrosis. The striking feature of the minute changes was thrombosis of the veins. In some instances the arteries also contained thrombi. In addition to fibrin masses in the vessels, many contained homogeneous, hyalin-like substances.

Stasis of the circulation without thrombus formation was indicated by agglutinated masses of red cells filling the vessels. The lenticular nucleus was almost constantly the seat of thrombosed vessels. In the six specimens in which thrombi were not seen in this location, the vessel walls were degenerated and partly or entirely digested in the midst of necrosed areas. Varying degrees of damage to the tissues about the vessels were observed. The minimum change was a slight edema. Usually necrosis was manifested by alterations in the glial nuclei, varying from pyknosis to entire disintegration. Frequently a wide region about the vessels was vacuolated and all nuclei destroyed. The arteries were usually empty. The extreme damage to the blood vessels may be in part accounted for by their previous condition, sclerotic changes being rather the rule than the exception in the cerebral vessels in this series. The capillary endothelium was usually fragmented, lying loose in the vessel lumen or altogether absent. Inflammatory changes about the vessels were seldom observed. Occasionally round cells were abundant along with a periarteritis in association with tuberculosis or syphilis in other organs, and one brain showed a polymorphonuclear accumulation. Aggregations of glial nuclei about the vessels suggest the possibility of proliferation of glial tissue, but the varying quantity of such tissue within small areas of the normal brain makes it unsafe to call these accumulations abnormal.

A conspicuous appearance in some of the brains, usually of elderly persons, was the accumulation of spherical masses from 4 to 20 microns in diameter beneath the pia and ependymal linings and about the blood vessels and perivascular lymph spaces in chaplet-like groupings. Their appearance in some regions of necrosis suggests a relationship to nerve cells. Within a small area were observed gradations from slightly altered nerve cells to granular fragments of these cells, with a faint nucleus seen only with the high power lens, to spherical homogeneous bodies. Mott[7] and Poelchen[9] have described droplets which they attributed to fatty degeneration of the vessel walls due to carbon monoxid poisoning. Other writers describe droplets of similar appearance in several types of lenticular degeneration, and numerous explanations are offered for their occurrence. They are regarded as degenerated axis cylinders, myelin sheaths and glial cells, as products of fatty degeneration of the vessel walls, and as products of the blood itself and of the cerebrospinal fluid. Whether they are antemortem products or artefacts is disputed. Shionaya[10] made extensive experiments on the staining properties of neutral fats, esters of cholesterol, myelin and lipoids in the central nervous system. He concludes that these globules are normal constituents of the globus pallidus, and that sex, age and general diseases have no influence on them, but that they are

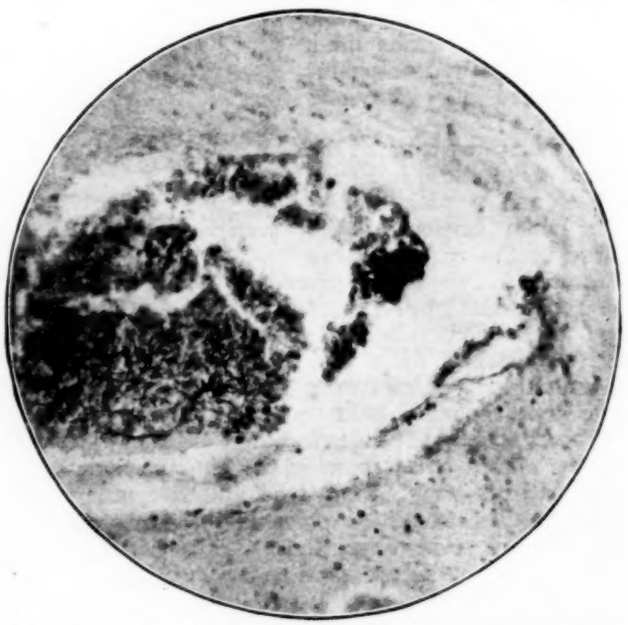

Fig. 4.—Characteristic vascular lesion in carbon monoxid poisoning. Thrombosis; degenerated vessel wall; perivascular necrosis. Phosphotungstic acid and hematoxylin stain, showing fibrin threads in blood vessel.

increased in number in all diseases producing degeneration of the nervous tissue. They stain yellow-red with sudan III, and are positive with Ciaccio's stain. The latter gives negative results with neutral fats and

9. Poelchen, R.: Zur Etiologie der Gehirnerweichung nach Kohlendunstvergiftung, Virchow's Arch. f. path. Anat., 1888, **112**.
10. Shionaya, F.: Mitt. a. d. med. Fak. d. k. Univ. z. Tokio, **14**, 121.

the esters of cholesterol. In our series the spherical bodies stained a deep purple with hematoxylin and eosin, were negative with sudan III, negative for hyalin and myelin with van Gieson's stain, and negative with Ciaccio's stain. From these staining properties we are unable to make a definite classification. Bearing in mind the very high fat content of nervous

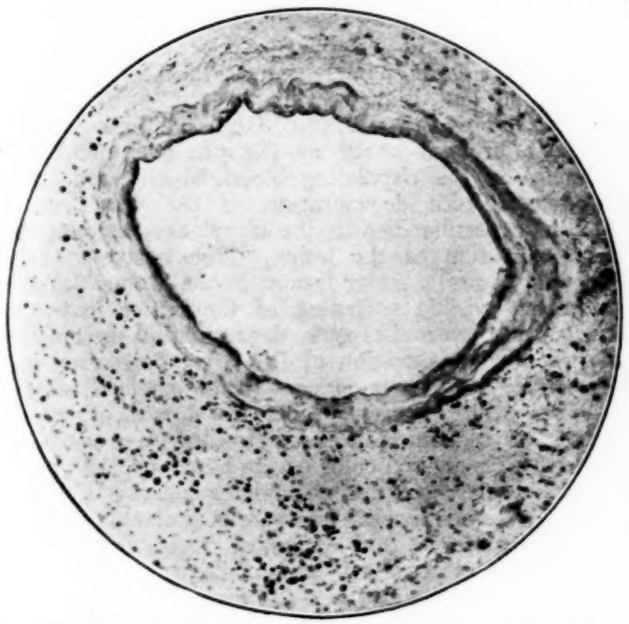

Fig. 5.—Accumulation of spherical bodies about a blood vessel.

tissue, we hesitate to attribute such accumulations to fatty degeneration of vessel walls. We presume that the spherical or globular bodies in our series are the same as those described by other authors, but we do not think they have any relation to carbon monoxid poisoning.

COMMENT

Chief interest attaches to the peculiar localization of the principal lesion in carbon monoxid poisoning in the lenticular nucleus and especially in its medial portion, the globus pallidus of both sides of the brain. Von Recklinghausen, Simon, Lesser and Poelchen observed this before Kolisko's monograph on the subject was published. Poelchen was satisfied from experiments that asphyxiation alone does not produce this lesion, but he thought that other poisons acting similarly to carbon monoxid might do so. He attributed the vulnerability of the lenticular nucleus to the long, thin end-arteries supplying this structure. Kolisko considered this explanation insufficient and called attention to the fact that the necrosis is ischemic rather than hemorrhagic. He postulated a mechanical theory, thus: The hairlike anastomosing arterioles arise from the cerebral portion of the internal carotids and their branches, the middle and anterior cerebrals. They pass at right angles from these vessels through the anterior perforated space into the brain substance. In acute poisonings the tissues supplied by these small vessels become anemic and eventually necrotic. The putamen suffers less than the globus pallidus because the vessels supplying the former have some anastomoses with a separate vascular supply. The initial increase of blood pressure in carbon monoxid poisoning tends to force the carotids upward against the brain and outward into the sylvian fissures and thus draws the small ganglionic branches outward from their proper location, which interferes with their circulation. Subsequent diminished blood pressure further lessens their blood supply. Deleterious effects of carbon monoxid on the vessel endothelium add to the retardation of the circulation. Another factor is the swelling of the brain tissue from edema pressing on the blood vessels. Again the widened carotids and their branches press the cerebrospinal fluid against the anterior perforated space and compress the vessels which pass through this space into the basal ganglions. While not altogether convincing, this is perhaps the most satisfactory explanation yet offered for the constant involvement of the globus pallidus.

The engorgement of the vessels of the white matter and their rupture logically follow as compensatory phenomena when the circulation just described has been greatly impeded. Greenacre,[11] in a study of spontaneous cerebral hemorrhages, calls attention to pontile hemorrhages found secondary to hemorrhages in the internal capsule and basal ganglions. She refers to anatomic peculiarities of the vessels supplying the pons (small, short, terminal branches given off at almost right angles from a large trunk), and suggests also a disturbance of blood pressure in the circle of Willis which may act on the posterior branches, as Kolisko describes in the case of the more anterior ganglionic branches.

It seems certain that the blood vessels bear the brunt of the damage in carbon monoxid poisoning. Haldane believes that all the effects can be referred to lack of oxygen, the symptoms increasing with the saturation of the blood with carbon monoxid. He has kept mice alive on exposure to from 200 to 300

Fig. 6.—Characteristic hyperemia and hemorrhage in the white matter of the brain in carbon monoxid poisoning.

times the fatal dose of carbon monoxid in the presence of oxygen, under high pressure (from one to two atmospheres). Mosso repeated the experiment with the same result, using monkeys instead of mice. On the other hand, Lanossier says that animals die sooner and with different symptoms in an atmosphere of carbon monoxid than when asphyxiated by nitrogen.

11. Greenacre, Phyllis: Bull. Johns Hopkins Hosp., 1917, **28**, 86.

Lancereaux thinks that carbon monoxid destroys the red cells which block the vessel lumen and lead to thrombus formation. Mott believes that carbon monoxid dissolved in the blood plasma irritates the endothelium and causes necrosis and rupture. The histologic appearance of the capillaries in our series suggests that the endothelium is extremely vulnerable. The precise method of destruction of vessel walls cannot be determined without animal experimentation carefully controlled, with the use of fresh material specially prepared and stained in a more thorough manner than has yet been undertaken.

The symptoms produced by inhalation of carbon monoxid are explained by the union of this gas with the hemoglobin, for which it has an avidity estimated to be from 200 to 300 times that of oxygen, and by the vascular degeneration consequent on its presence in the circulation.

There is an initial rise in blood pressure, with slow pulse and pounding heart beat. This is followed by lowered blood pressure, rapid and small pulse, with dilatation of the peripheral blood vessels. In mild cases there is a dull headache, flashes before the eyes, dizziness, ringing in the ears, nausea and vomiting. According to Haldane, 20 per cent saturation of the blood with carbon monoxid produces these symptoms. With 50 per cent. saturation one is scarcely able to stand, and faints on slight exertion; 80 per cent. saturation is fatal. The symptoms vary with the temperament of the individual, as in alcoholic intoxication. In severe cases there are cyanosis, difficult respiration, convulsions, paralyses, subnormal temperature, weak and intermittent pulse, and unconsciousness. Pneumonia, both lobar and lobular, follows with great frequency if the patient lives many days.

On recovery from acute poisoning, and in chronic poisoning, the end-results vary according to the previous condition of the nervous system. Existing brain lesions may be accentuated, so that carbon monoxid poisoning has been said to simulate almost every variety of nervous disease.[12] Multiple softenings may produce the picture of insular sclerosis.[13] Paralyses, convulsive seizures, impaired memory and psychoses frequently follow. Suicidal attempts may result from insanity caused by carbon monoxid poisoning, and of course poisoning may be itself the suicidal act of one already insane.

Tremors, muscular spasms and pareses are accounted for by the peculiar involvement of the lenticular nucleus and the internal capsule. We cannot enter here on the disputed questions of the functions of the lenticular nucleus. Wilson[14] has recorded elaborate experiments tending to show that the corpus striatum is independent of the cerebral cortex and exerts a steadying influence on the lenticulorubrospinal projection system on innervation of the corticospinal (pyramidal) system, being concerned with the maintenance of the tone of the skeletal muscles. Several syndromes are described in neurologic literature which appear to depend on involvement of the corpus striatum, as paralysis agitans, Wilson's[15] progressive lenticular degeneration, pseudosclerosis of the lenticular nucleus,[16] Voigt's spastic pseudobulbar paralysis, Huntington's chorea, progressive athetosis,[17] and progressive atrophy of the globus pallidus.[18] Pollock[19] has recently reviewed the subject and described very similar changes to those of carbon monoxid poisoning in his case of Wilson's disease. It would perhaps be pertinent to inquire into the possibility of a chronic carbon monoxid poisoning in those diseases in which the lenticular nucleus is softened.

12. McGurn, W. J.: Boston Med. and Surg. Jour., 1917, **176**, 231.
13. McGurn, W. J.: Interstate Med. Jour., 1917, **24**, 479.
14. Wilson, A. S. K.: Brain, 1913-1914, **36**, 427.
15. Wilson, A. S. K.: Brain, 1912, **34**, Part 4.
16. Strumpell: Deutsch. Ztschr. f. Nervenh., December, 1915.
17. Spiller: Jour. Nerv. and Ment. Dis., 1916, **43**, 23.

CONCLUSIONS

Carbon monoxid poisoning produces a characteristic lesion of the brain, namely, a bilateral ischemic necrosis of the lenticular nucleus, especially the globus pallidus. This lesion results from the vascular disturbance brought about by the presence of carbon monoxid in the circulating blood which produces a thrombosis with degeneration of the vessel walls. Anatomic peculiarities in the circulation account for the localization of the lesion. The necrosis varies from slight perivascular lesions in the globus pallidus to grossly visible softening of the entire lenticular nucleus and internal capsule, depending on the amount of gas inhaled, duration of life after poisoning, and preexisting pathologic changes in the cerebral vessels.

When death occurs within a few hours, other evidences of carbon monoxid poisoning are available, namely, a cherry-red color of the blood, a pink hue of the brain substance, and petechial hemorrhages in the skin and various mucous and serous surfaces; further, the spectroscopic and chemical tests for carbon monoxid in the blood are positive. These evidences later disappear, and the diagnosis depends on the characteristic lesion in the lenticular nucleus.

Spontaneous hemorrhages in the leptomeninges and punctiform hemorrhages throughout the white matter of the brain are part of the profound vascular disturbances in carbon monoxid poisoning.

Nerve cells possess a high degree of tolerance to the poisonous action of carbon monoxid.

Edema and hyperemia of the brain and internal hydrocephalus are frequent appearances in carbon monoxid poisoning.

Cerebral arteriosclerosis cannot be attributed to carbon monoxid, but it probably increases the vulnerability of the individual to small amounts of the gas.

Carbon monoxid poisoning as a cause for the subsequent development of nervous and mental disease as well as for deaths which may not be explained easily receives emphasis from this study. The occupation and other conditions of living as well as careful gross and microscopic examination of the brain are of importance in demonstrating such a causal relationship.

30 North Michigan Avenue—5201 Magnolia Avenue.

18. Hunt, J. R.: Brain, 1917, **40**, 58.
19. Pollock, L. J.: Jour. Nerv. and Ment. Dis., 1917, **46**, 401.

Exercise and the Tuberculosis Patient.—The problem of exercise is one that will frequently tax the acumen of the physician. The febrile tuberculosis patient in whom the maximum daily temperature habitually exceeds 99.5 F. should unquestionably be kept in bed. The best rule is to require the acute case to rest irrespective of temperature, as the condition becomes more chronic to be guided strictly by the thermometer, and when the case has become one that is progressing toward arrest to ignore the slight fluctuations of the temperature. Patients who have large lesions must be treated with more severity in respect to the enforcement of quietude than those with small lesions. Each case must be the subject of special study. As has been well said, the patient who begins to exercise has reached a period of danger in his course of treatment.—*American Review of Tuberculosis.*

Military Medicine and Surgery

END-RESULTS FROM TREATMENT OF COMPOUND FRACTURES OF THE FEMUR BY THE CALIPER METHOD

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FRANCE

Since the appearance of the preliminary report on the treatment of war fractures of the femur by means of extension by the caliper or ice tong method, by Major Frederic A. Besley,[1] more than fifty cases have been treated by this method, and the end-results have been sufficiently satisfactory to merit discussion.

To review briefly the technic of obtaining extension by means of the calipers: The patient generally arrives at the base hospital within from twelve to forty-eight hours after being wounded, depending on whether or not his condition is satisfactory for transportation. His wounds have usually been excised at a clearing station and all damaged skin, fascia, muscle, detached bone and foreign bodies, such as metal, clothing and dirt, removed. He is transported in a Thomas splint with moderate extension maintained by the use of glue applied below the knee joint. We consider the Thomas splint an ideal one, as it completely immobilizes the part, renders the wounds accessible, provides for extension, is easy to apply, and insures comfortable and safe transportation. On his arrival at the base hospital, the patient's wounds are immediately inspected for the presence of either gas infection or secondary hemorrhage. If his condition is satisfactory, he is made comfortable and allowed to rest for from twelve to twenty-four hours. The following day he is taken to the roentgen-ray laboratory, where his thigh is fluoroscoped. If a foreign body is still present it is localized and the site of the fracture is then plated. The patient is now removed to the operating theater and anesthetized, usually with ether, and the Thomas splint and glue extension are removed, while an orderly maintains moderate traction on the leg. A couple of sand bags are placed under the knee joint to elevate it and the entire condylar area is surgically prepared. A small incision, just sufficient to admit the point of the caliper, is made through the skin and fascia over the most prominent part of the internal and external condyles. The calipers are inserted and driven into the cancellous bone about a quarter of an inch, without any preliminary drilling. The caliper points must enter the bone just above the most prominent part of the condyle, as near the middle as possible, and a little higher on the inner than on the outside.

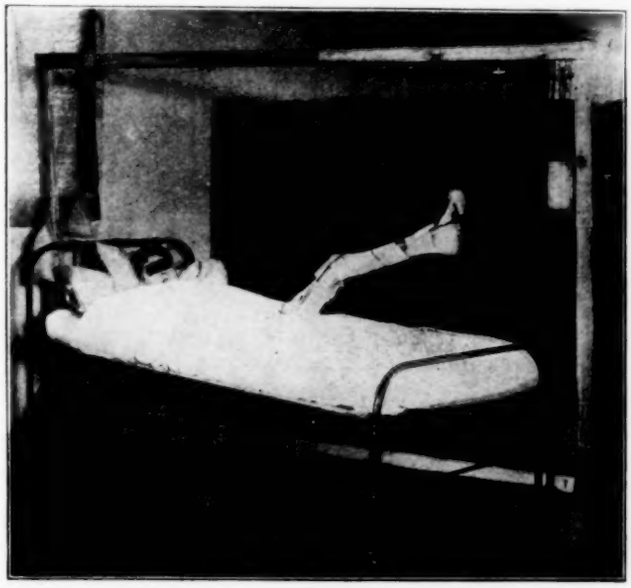

Fig. 1.—Two weeks following injury. The traction is pulling in the same direction as the long axis of the thigh. A fixed foot piece is used in this case. Later glue was applied to the sole of the foot and the foot suspended from above by a small weight in order to relieve pressure from the Achilles tendon and allow voluntary motion of the ankle joint. The weights seen at the head of the bed support the splint. The right sided weight is only 5 pounds in order to prevent unnecessary pressure in the groin. As this is a fracture of the upper third of the femur, extreme abduction is present, though not shown well in this picture.

It is necessary to exercise great care that the caliper points do not enter the knee joint. In eight of our cases which terminated in either amputation or death, dissection of the joint demonstrated that the synovial sac had not been penetrated, and distention of the joint capsule produced by injecting warm gelatin and allowing it to solidify revealed a relatively safe area for the application of the calipers, as is shown in Figures 3 and 4.

Particular care, however, must be taken in those cases in which a marked effusion is present in the knee joint. This condition most often results from a direct trauma to the knee joint, caused by the patient's striking the ground after being wounded. We have been fortunate enough in our cases to avoid this possible complication. The small incision wounds are then iodized and a dry, sterile dressing applied, which is not disturbed during convalescence. The ends of the calipers are tied firmly together to assure the points remaining in place until traction is applied.

The gunshot wounds of the thigh are now examined and paraffin or bismuth iodoform petrolatum packs removed, if present. Any foreign body which remains and is accessible without doing much damage or opening new areas for possible infection is removed, and devitalized muscle or bone fragments without periosteal attachment are excised. Better drainage is provided for, if indicated. Sterile petrolatum dressings are applied to the wounds, and a Thomas splint, bent at the knee, depending on the location of the fracture, is replaced. The thigh and leg are suspended from the splint by means of strips of flannel bandage which are well padded and held in place by metal clips, and a foot piece adjusted so as to hold the foot at right angles and to prevent any inward rotation. The calipers can be applied with either nitrous oxid or local anesthesia. However, if the gunshot wounds are to be explored and better drainage provided, it is better to use ether as routine unless some contraindication for a general anesthetic is present.

The patient is returned to the ward, and while still asleep the entire splint is suspended from a Balkan frame by means of a system of pulleys and weights. A weight of from 10 to 15 pounds, depending on the muscular development of the patient, is applied to the

1. Besley, F. A.: Value of the Caliper in Obtaining Extension in Compound Fratures of the Femur, THE JOURNAL A. M. A., Jan. 12, 1918, p. 87.

ends of the calipers, the traction being adjusted in the same direction as the long axis of the thigh. No manual force has been used in reducing such infected fractures. Instead, we have depended on our extension and abduction to approximate the fragments. Some abduction has been used in every case, increasing it the higher the fracture is located. The danger of embolus and the possibility of generalizing the infection from manipulation are well recognized.

The maximum weight used for extension has been 16 pounds, and this has been sufficient to paralyze the thigh muscles in every case. During the first twenty-four hours following operation, the patient may have some pain in his knee; but this soon disappears, and he is very comfortable. The wounds are dressed daily or more often, depending on the amount of suppuration present, the clips allowing the supporting flannel to be removed in sections and thus avoiding pain due to the loss of support. The use of a bedpan is made easy by means of a sling attached to the Balkan frame above the patient's head by which he can lift himself from the bed. In place of metal clips, perforated zinc carriers have been used to support the thigh and leg in the splint. These, however, have not been as satisfactory as the clips, as they are easily broken, interfere with roentgen-ray examination, do not permit sectional dressing, and often scratch the hands of the person dressing the wound.

The patient's course depends largely on how quickly suppuration can be controlled. No matter how extensive the wounds are or to what degree the bone has been damaged, complete rest is the fundamental principle in healing. In some cases the patient's resistance is good, the infection clears up rapidly, the wounds fill in with healthy granulation tissue, and bone regeneration progresses so that union is present after five or six weeks. In other cases, the sepsis is more stubborn and the pus burrows between the muscular planes of the thigh, collecting in pockets which necessitate subsequent drainage. The traction, which soon paralyzes the thigh muscles and keeps them on a stretch, unfortunately does not entirely prevent the formation of pus pockets. A retained shell fragment, a piece of clothing, or an osteomyelitis with sequestrum formation is usually responsible for the prolonged suppuration of a wound. We firmly believe that gravitation has much to do with the direction in which the pus spreads. Since the Thomas splint is always bent in some degree at the knee, this joint is at a higher level than the hip joint; consequently, favored by gravity, the infection, when it spreads, burrows down toward the buttock, which is the lowest point. In no case has the infection been observed to travel upward toward the knee.

Fig. 2.—Calipers in situ in a femur amputated because of secondary hemorrhage. The blackened area over the articular surface shows the extent of the knee joint and the safe area on each side above the condyles where the calipers can be inserted without entering the synovial sac.

Fig. 3.—Calipers in situ in a case in which amputation was performed because of a severe sepsis. The knee joint has been injected with gelatin to show the extent of the synovial sac. Internal surface.

Fig. 4.—Same case as Figure 3, external surface.

The Thomas splint is often difficult to employ with comfort to the patient when there are extensive buttock wounds, on which the lower half of the ring exercises pressure. In such cases an anterior or posterior Hodgens splint can be used to better advantage, the thigh being sharply flexed to nearly a right angle and suspended from overhead, rather than from the end of the Balkan frame. This allows the patient comfort and greater ease when being dressed, but is hardly as satisfactory as the suspended net arrangement devised by Major Sinclair, R. A. M. C.

When bony union is partially complete, the patient is again roentgenographed to determine the position of

the fragments and the amount of callus formation. He is also roentgenographed any time during this course when correct apposition is doubtful or if there is no attempt at union within a reasonable length of time. The ideal arrangement would be, of course, a portable roentgen-ray apparatus with which each case could be plated and studied in the exact position the fragments occupy while in the frame with extension applied. This apparatus has so far not been used here, and as a result, the exact amount of traction necessary has at times been a matter of conjecture. When bony union is firm according to clinical and roentgen-ray evidence, the calipers can be easily removed in the wards without an anesthetic and without pain to the patient, and a dry sterile dressing applied until the incision wounds are healed.

Gentle, passive motion of the knee joint is instituted at once; in fact, patients are encouraged to move the knee a little at frequent intervals before the calipers are removed, if some degree of union is present. Such motion does not damage the fracture site and has the advantage of eliminating the pain on manipulating the joint when the splint is removed. The same principle applies equally as well to the ankle joint. Some of our cases developed considerable edema of the ankle joint (periarticular) resulting from too great a degree of dorsal flexion of the foot, which was applied to avoid a possible foot drop. A wide piece of flannel bandage or gauze applied to the sole of the foot by means of glue and suspended from over head by a 2 or 3 pound weight accomplished better results than a fixed foot piece, as it allowed voluntary motion of the knee and ankle joint and relieved all pressure from the heel and Achilles tendon. Patients treated in this manner have avoided edema and limited joint motion (because of prolonged immobilization) except in a couple of cases in which the sciatic nerve was partially damaged and consequently the ability to move the foot lost.

Fig. 5.—Compound comminuted fracture of the lower end of the femur involving the knee joint. Anteroposterior view of the fracture on admission of the patient to the hospital.

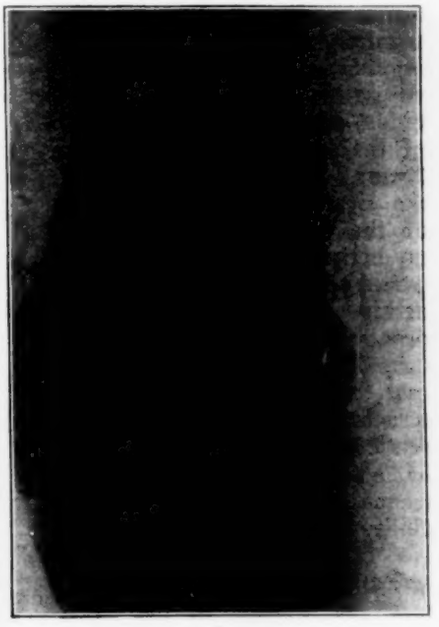

Fig. 6.—Anteroposterior view of the fracture shown in Figure 5 after six weeks of extension with glue. There has been practically no change in the position of the fragments. Three inches of shortening is present.

CALIPER INFECTION

The success of this method of extension and the complete comfort of the patient is going to depend considerably on whether or not the caliper incisions become infected. In our series, this complication occurred in 18 per cent. of the cases, which on first observation may appear very high and sufficient to question the advisability of their use. On careful analysis, however, we find that most of such infections were due to preventable causes, and a second series of cases treated could be kept to a low percentage (2 or 3 per cent.).

Experience has taught us that the caliper incisions after being dressed sterilely and bandaged in the operating theater, at the time of insertion, should be left undisturbed. There is no indication for any further dressing and it only invites infection, as there are frequently suppurating wounds in the immediate vicinity. In a few of our cases we drove in the calipers without any preliminary skin incision, the object being to decrease the possibility of infection. This technic is very satisfactory, provided the caliper points are sharp and do not drive the skin in ahead of them. The calipers used here were all improvised from either meat skewers or wire. As a result of their crude construction, they frequently broke at the cross pieces where they were riveted, or the points bent when driven against the hard bone. Consequently, in a certain number of cases the reinsertion of a second pair of calipers was necessary and this procedure was practically always followed by infection. There is no doubt that the use of a well constructed steel caliper would eliminate the most frequent cause of suppuration around caliper incision.

Another very important cause of caliper infection occurred in patients whose early days in the hospital were attended by delirium due to associated head injuries, and during which time they became violent, tore out their calipers, and infected their caliper incisions. The use of proper arm restraints or a caliper kept firmly locked by a set screw would easily prevent this complication. In two patients, who were profoundly septic during a long period of time, infection around the caliper points developed spontaneously and was probably due to a general lowered resistance of the patient.

When the caliper incisions become infected regardless of cause, how much damage results and how does it affect the patient's comfort and convalescence? In the majority of our infected cases the suppuration has remained localized around the calipers, either on one or both sides, and no drainage has been necessary. In such cases we at first removed all the weight from the calipers until the infection subsided; but lately we

have only slightly decreased the traction for a few days if the patient complained of discomfort. In three cases the infection was more severe and gravitated down the thigh, necessitating a long lateral incision through the skin and fascia and allowing free drainage, the amount of traction being decreased for a few days while the infection was most acute.

The question as to how much the calipers damage the cancellous bone of the lower end of the femur is somewhat difficult to answer definitely at this time. In cases not infected, it is certain very little harm is done, and bone regeneration soon fills in the small defect. In infected cases it is quite possible to see how a periostitis and even an osteitis could develop; but we have had neither clinical nor roentgen-ray evidence of such a complication. That infection can be present around the calipers without influencing the bone itself was demonstrated in a case in which the calipers were applied for a period of twelve weeks and infected from the time of insertion, as a suppurating wound was present over the external condylar area. Amputation was performed in this case because of severe sepsis and nonunion, and a cross section of the lower end of the femur, exactly through the site of the insertion of the calipers, revealed no bony destruction. It would appear that if periostitis or osteitis were prone to occur, this would have been a favorable case, as the patient was emaciated, had multiple septic wounds of the legs, bilateral gangrenous trench foot and little ability to resist infection. No case in the entire series presented any signs of damage to the bony structures by the calipers or evidence of a consequent osteomyelitis.

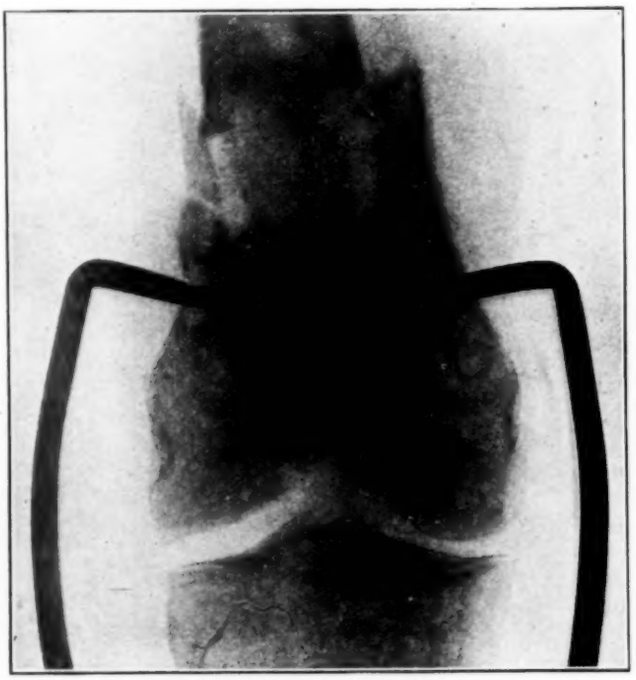

Fig. 7.—Anteroposterior view of the fracture after seven weeks of caliper extension. No shortening present. The calipers have been driven in a little too far in this case.

CONTRAINDICATIONS FOR THE USE OF CALIPERS

There are very few contraindications for the application of the calipers in fractured femurs, and we have used them alike in both the simple and the compound varieties and regardless of the site of the fracture and the amount of comminution. In cases in which one or both condyles have been shot away they are of course impracticable. When suppurating wounds are present over the condylar area with little or no accompanying bone damage, the insertion of the calipers is questionable and would depend largely on the judgment of the surgeon and on his decision as to whether or not he would care to risk infecting the cancellous bone.

The presence of suppurating wounds near the site of introduction of the calipers is hardly a contraindication for their use since by bandaging the incisions and then leaving them undisturbed, usually no infection results. Comminuted fractures of the lower end of the femur involving the knee joint have been treated by this method of extension with very favorable results.

ANALYSIS OF CASES

The number of cases reported in this series is limited to fifty, because at the end of that time segregation of all fractured femurs in a special hospital was recommended by the British Surgical Service. Practically all the patients were healthy, well developed men whose average age was about 28 years. The youngest was a boy of 18, while the oldest was a Scotchman of 57, who, in addition to his compound fractured femur, had a shattered arm which demanded immediate amputation. His course was very septic and terminated fatally in about five weeks with a bronchopneumonia. The right and left thighs have been about equally involved. In regard to the location of the fracture, 33 per cent. were present in the upper third of the thigh, 54 per cent. in the middle third, and the remaining 13 per cent. in the lower third. Only two of the fractures, or 4 per cent., were of the simple variety, and of the 96 per cent. that were compounded, over one half were badly comminuted in addition.

The wounds of the fleshy parts of the thigh varied from small, sharply defined tracts to extensive evacuations with much loss of substance. They had practically all been excised and left open, and so were infected at least to some degree when reaching the base hospital. Primary union was therefore not common, and seen in only two cases. The length of time required for the wound to heal by secondary union varied considerably. In at least 75 per cent. of the cases, healing was complete by the time the bone had firmly united, so that the patient could be evacuated to England; and in 25 per cent. of the cases there was some serous or purulent discharge on transferal. Foreign bodies remained present in 40 per cent. of the cases, either one or many pieces of metal. In two cases large pieces of shrapnel were removed, followed by rapid closure of the wound. Thirty per cent. of the cases required a second operation of some variety, either for removal of foreign bodies and a provision for better drainage or an amputation.

It is not the purpose of this paper to discuss the relative merits of the various chemical substances used in treating infected war wounds. Fundamentally, their success or failure depends largely on the thoroughness of the primary mechanical cleansing of the wounds rather than whether bismuth iodoform petrolatum or the Carrel-Dakin treatment is used later. In this series, the wounds were for the most part dressed with sterile gauze, either dry or smeared with petrolatum

to prevent adhesion. When the suppuration was profuse and of a very foul odor, and considerable necrotic tissue was present, eusol dressings were used with satisfactory results; and when the infection was acute with a tendency to spread, hot boric fomentations, changed every four hours, were employed to good advantage. The open air treatment was impracticable at this time of the year, owing to the low temperature of the ward.

The average length of time necessary to obtain firm, bony union has been from eight to nine weeks, and it has been our policy to keep the calipers in place with some traction applied until such union was obtained. The question has been raised, whether, after six or seven weeks of heavy extension, the muscles are not paralyzed to such a degree as to prevent subsequent shortening, even though the callus is not firm. In two of our cases in which the extension was removed after seven weeks and the callus was still soft, the muscles were able to recover and increase the amount of shortening by nearly an inch. In our cases of delayed union, either due to the primary destruction of much bone or to severe sepsis, we have kept up extension by means of the calipers for fourteen or fifteen weeks, the traction being decreased to 5 or 6 pounds during the later weeks.

The end-results as regards shortening and deformity can be thus summed up: The total shortening in forty cases evacuated to England amounted to 15½ inches, all of this occurring in eighteen cases. Of the remaining twenty-two cases, twelve presented similar measurements of both thighs, and ten showed a total lengthening of 5½ inches. This gives an average shortening per patient of three-eighths inch. The greatest amount of shortening in any case was 2 inches and resulted from the calipers being removed early because of infection, and no other method of extension could be substituted. The greatest amount of lengthening obtained was 1¼ inches, occurring in a badly comminuted fracture in the trochanteric region. Particularly good results were obtained in several cases which had been held in extension by glue for several weeks and reached us with little or no union and much shortening. In one patient this amounted to 4 inches, and by caliper extension it was reduced to three-quarters inch.

Roentgenograms were taken in nearly all cases before and after treatment. In 70 per cent. of the cases the final plates showed satisfactory results, that is, good alinement, little or no angulation or overriding, and abundant callus formation. The remaining 30 per cent. presented some deformity, either an overriding due to deficient traction, or angulation due to faulty supports or too little abduction. This was marked in but three cases, and even in these, a useful leg was assured. Two patients had no attempt at bony union after sixteen weeks of treatment, so they were then evacuated to England. This nonunion was rather difficult to explain, as their courses had been absolutely afebrile except for the first few days, their wounds never suppurated markedly and healed within a few weeks, and the roentgen ray showed a satisfactory position in both anteroposterior and lateral views with no foreign bodies or sequestrums present.

Thigh amputation was necessary in 14 per cent. of the cases. Two were indicated because of severe secondary hemorrhage, and extreme sepsis with nonunion was responsible for the remaining five. The mortality in this series was 14 per cent., four of the amputations having a fatal termination. Of the three remaining deaths, two were due to acute bacillary gangrene which had extended so that amputation was useless, and one was due to a bronchopneumonia. Ten per cent. of the patients presented partial or complete sciatic nerve injury and had lost both motor and sensory power in the affected foot and leg. This condition remained practically stationary during their entire convalescence.

The technic of this form of extension in fractured femurs and the calipers themselves have not reached perfection as yet, and with an improvement in technic and materials with which to work, even more favorable end-results can be expected. The British medical stores are now furnishing a well made, nickel plated steel caliper, which was modeled after the crude wire ones we used. This new caliper, however, has certain faults, the most serious being that the point of crossing of the calipers, where they are riveted, is not close enough to the ends where the traction is applied. By advancing this point of crossing, which represents the fulcrum, the leverage has been correspondingly increased, with the result that when a 15 pound weight has been applied for traction, the caliper points have been gradually forced into the cancellous bone, much farther than is necessary. Such a result occurred in which we used these ordnance calipers, and similar results have been reported to us from other hospitals where they are now being used. The substitution of a set screw in place if a rivet would be a distinct improvement in that the caliper points would be held as firmly in the bone as a nail driven entirely through, and there could be no loosening of the points when the traction is temporarily removed, as is necessary in transporting the patient to the roentgen-ray laboratory. At present instead of a set screw we use a stout cord or a small spiral spring to hold the handle ends of the calipers together. The caliper method accomplishes everything that the Steinman nail driven through the lower end of the femur does, and has the advantage of causing less damage to the bone and less danger of a central osteomyelitis.

The Rain-Barrel Mosquito.—If there is a rain barrel, or any receptacle for stagnant water about premises, the notice of the Connecticut State Entomologist will serve as a warning. It says: Even though all fresh water swamps are drained we may suffer from the bites of the house or rain-barrel mosquito which enters the house and bites after dusk. This kind of mosquito breeds in rain-water pools, rain barrels, tubs, buckets, tin cans, etc.; in fact in any receptacle which may fill with water when the first hard shower comes. Wherever any building operations are being carried on, there are usually tubs or barrels of water, and many householders carelessly leave around the premises tubs, kettles, or tin cans which serve as breeding places; then too, old cisterns, clogged roof gutters, eave spouts and leaders occasionally furnish a breeding place and should be given attention. A little kerosene applied to the surface will kill all "wrigglers." Everyone should see that no such possible breeding places exist on his premises, but we cannot depend on everybody to look out for this. Hence it is essential that municipal inspectors be sent from house to house for this purpose. If mosquitoes are troublesome just after dark, it is reasonable to suppose that they are rain-barrel mosquitoes and that their breeding place is close at hand, probably on the premises. The first thing to do then is to search for stagnant water, for without stagnant water there can be no mosquitoes. If rains are abundant, all receptacles and depressions will fill with water; but if there are no receptacles and no depressions to hold water, there will be no mosquitoes even in a wet season.

INTRADERMAL VACCINATION AGAINST SMALLPOX

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By intradermal vaccination is meant the deposition of smallpox virus between the layers of the skin. In the days of smallpox inoculations, Sutton,[1] and later Dimsdale,[2] in their respective methods aimed to deposit the variolous material between the skin layers. Ruhräh,[3] in describing the various methods of vaccination, says, "Another method is the intradermic injections of the lymph, which is done with a hypodermic syringe, the needle being introduced not through the skin but into it, and a small quantity of lymph injected." He gives no further description of the technic used, nor any reference to the original work on which the statement is based. Force and Beckwith,[4] as a result of their study of the skin reactions following the intradermal injection of vaccine into rabbits previously sensitized by vaccination, offer injection of virus as a method for the laboratory diagnosis of smallpox. The articles by Ruhräh and Force and Beckwith are the only two references to the intradermal injection of smallpox virus for any purpose that could be found after a rather careful search of all easily accessible literature. It seems justifiable to conclude, therefore, that relatively few published observations have been made with this method, or else the observations that have been made, possibly, did not warrant further investigation along this line.

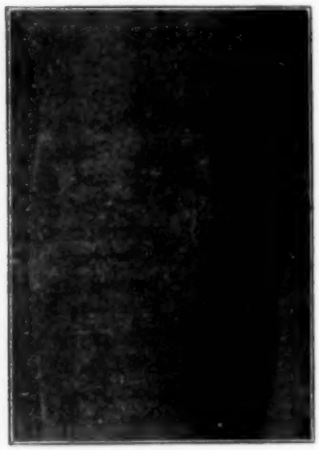

Fig. 1 (No. 11054).—"Take" by intradermal method; tenth day after vaccination. Two sites of injection used. The two circles of vesicles are confluent. No history of smallpox; man never vaccinated in civil life; since entry into the service, vaccinated seven times with negative results.

VARIOUS METHODS OF VACCINATION

In describing the various methods of vaccination, Rosenau[5] states that the virus may be introduced in three ways, namely, (1) by puncture, (2) by scarification, and (3) by incision.

Puncture.—A few simple punctures are made with a needle and the virus rubbed in gently. This method, according to Rosenau, is less apt to yield satisfactory results because of the attenuation, by dilution with glycerin, of the virus used today. In Hill's method the punctures are made through the drops of virus applied to the skin. This method has been used with excellent results by DeLanney.[6]

Scarification.—A series of cross scratches are made with a needle, scalpel or ivory point, and the virus is gently applied to the abraded surface. Copeman[7] thinks that application of the lymph to the skin, followed by scarification through the lymph, gives the best results. The scarification method has been practically discarded by the profession universally, because of the large number of infected arms that have followed its use in comparison with other methods, a result that is due to the large crust or scab that forms and favors infection.

Incision.—This method is very properly known as the Army method of vaccination. The following abstract taken from Vedder[8] is self-explanatory:

> Bulletin No. 30, W. D., Washington, July 15, 1914. In carrying out the requirements of Paragraph II., General Orders No. 30, War Department, 1914, all vaccinations will be preceded by cleansing of the site, preferably the brachial insertion of the deltoid, with water and alcohol.
>
> The skin at selected site must be clean; antiseptics are not necessarily employed; should they be used they must be washed away with sterile water that the activity of the virus be not destroyed. Washing with warm water, followed by alcohol, is usually sufficient, the alcohol being permitted to evaporate before proceeding. Scrubbing with soap and water is necessary for a dirty skin, but needless irritation of the skin is to be avoided.

The procedure described as follows is preferable to "scarification," which will no longer be used.

> Incision is the method of choice and it should be made with the point of a sterile needle producing a "scratch." A sterile scalpel may be used, but is more likely to cause bleeding. The incision or scratch should preferably not draw blood. There should be at least two incisions, three quarters of an inch long and one inch apart; after exposure to smallpox, four incisions will be made. The virus is then placed on the abraded surface and gently rubbed in, unnecessary irritation being avoided.
>
> The wound is allowed to dry thoroughly and can be left without dressing, though several layers of gauze may be applied with adhesive plaster. Any dressing that retains heat and moisture is bad. Shields will no longer be issued.

Fig. 2 (No. 9474).—"Take" by intradermal method; eighth day after vaccination. One site of injection used. Below are seen the scars resulting from an incision method vaccination done on the same day. Man never vaccinated in civil life; since entry into the service, vaccinated five times with negative results.

Cope[9] makes four incisions through 4 drops of lymph applied to the skin, each drop being situated about 1 inch from either of the others. Force[10] removes a small circle of epidermis with a chisel, by rotary motion, and then applies the virus; with his method he obtained on first insertion 95.8 per cent. "takes" on all that he vaccinated, as contrasted with 63.8 per cent. by the old method. Knöpfelmacher has produced immunity in children by

1. Sutton, Daniel: The Inoculator or Suttonian System of Inoculation, London, 1796, p. 77; introduced in England in 1763.
2. Dimsdale, Thomas: The Present Method of Inoculating for Smallpox, Philadelphia, 1771, p. 18.
3. Ruhräh, John: Billings-Forchheimer's Therapeusis of Internal Diseases, New York, D. Appleton & Co., 1917, **2**, 69.
4. Force, J. N., and Beckwith, H. L.: A Laboratory Method for the Diagnosis of Smallpox, THE JOURNAL A. M. A., Aug. 14, 1915, p. 588.
5. Rosenau, M. J.: Preventive Medicine and Hygiene, New York, D. Appleton & Co., 1917, p. 9.
6. DeLanney, E. L.: The Army Method of Vaccination, Mil. Surgeon, 1918, **42**, 84.
7. Copeman, S. M.: Modern Methods of Vaccination, Lancet, London, 1901, **2**, 1721.
8. Vedder, E. B.: Sanitation for Medical Officers, Philadelphia, Lea & Febiger, 1917, p. 15.
9. Cope, A. E.: Vaccination with Glycerinated Calf Lymph, Brit. Med. Jour., 1902, **2**, 43.
10. Force, J. N.: An Investigation of the Causes of Failure in Cowpox Vaccination, THE JOURNAL A. M. A., May 9, 1914, p. 1466.

the subcutaneous injection of glycerinated virus diluted with physiologic sodium chlorid solution.[11]

IMPORTANCE OF SUCCESSFUL VACCINATION

Today the importance of the successful vaccination and revaccination of troops is appreciated by the medical officers of all armies. In the Three Hundred and Sixty-Seventh Infantry, with which regiment I am serving, the regimental medical officers found large numbers of men on whom repeated revaccinations, and, in many cases, primary vaccinations by the prescribed incision method, gave negative results. The question immediately arose as to whether or not these men were immune to smallpox. According to their histories, very few of them had ever had smallpox, while arm examinations for vaccination scars showed that the majority of them had been successfully vaccinated in civil life — in most cases from ten to fifteen years previously. Some were found who had never been successfully vaccinated against smallpox and had never been through an attack of the disease. Therefore, it seemed reasonably clear that most of them were not immune, and that those who were immune possessed only a partial immunity. At the same time it was evident that their failure to give "takes" was not due to the virus used, because with it we were daily getting a large number of "takes" on other men. Then it occurred to me that intracutaneous injections of vaccine virus might prove to be a more satisfactory method of virus transference than the one that we were using; therefore, it was for the purpose of reducing to a minimum the number of unsuccessful vaccinations in the regiment that this work was undertaken.

Fig. 3 (No. 9471).—Vaccinoids by both methods; outer one by the incision method; seventh day after vaccination. One site of injection used. His tory of smallpox eleven years before.

THE INTRADERMAL METHOD

The method used was as follows: Virus treated with a glycerol-phenol solution was used. The composition of the glycerol-phenol solution was: phenol (carbolic acid), 1 part; glycerin, 49 parts, and water, 50 parts. The virus was diluted with equal parts of sterile distilled water immediately before using, although in a few of the first cases undiluted virus was used. Dilution of the virus was made solely to avoid waste, because I soon discovered that the diluted virus gave just as good results as the undiluted; and sterile distilled water was used for dilution instead of glycerin because it was feared that further dilution with glycerin might cause too much attentuation of the virus. One tenth c.c. of the diluted virus was injected intradermally by means of a sterile tuberculin syringe and a relatively fine needle, which was also sterile. I used needles size 26 according to the English standard wire gage No. 189. The site of injection was the skin area covering the insertion of the deltoid muscle. In some of the cases only one insertion was made, but, in most of the cases, two injections were made, one being separated from the other by a distance of about 1 inch. Two injections are preferred because of the larger area of vesicle formation that results, thereby affording one a better sense of protection, if not actual protection. Control vaccinations by the incision method, as described above, were made on all men vaccinated by the intradermal method; they were made on the same arm, on the same day, and the same virus was used in the two methods. Control injections of the virus-free glycerol-phenol solution, of exactly the same percentage composition as the fluid medium in which the virus was preserved and as shown above, were made on sixty of the men who volunteered. Two tenths c.c. of this solution was used for each injection, which was also made intradermally.

RESULTS

Intradermal vaccinations and controls by the incision method were carried out on a total of 227 men. All of these men during the preceding four months had been unsuccessfully vaccinated by the incision method a number of times, the number varying from two to eight. "Takes" were obtained in 160, or 70.48 per cent., of the cases by the intradermal method, whereas "takes" were obtained in only nineteen, or 8.3 per cent., of the same cases by the incision method. All of the nineteen cases that showed a "take" by the incision method also showed a "take" by the intradermal method. There were sixty-seven cases that failed to show a "take" by the intradermal method; in all but four of these cases, however, the vaccination site showed either an "immunity reaction" or "vaccinoid." The "immunity reaction" occurred in most instances. The 208 cases that did not give a "take" by the incision method exhibited "immunity reactions" and "vaccinoids" in but few instances. The "immunity reactions" and "vaccinoids" that occurred in these cases were identical in every way with those described by Kolmer.[12]

Fig. 4 (No. 9479).—"Take" by both methods; eighth day after vaccination. One site of injection used. No history of smallpox. Man never vaccinated in civil life; since entry into the service vaccinated three times with negative results.

In Table 1, the number of unsuccessful vaccinations by the incision method during the past four months is detailed, as well as the results obtained by myself with both methods.

Table 2 shows the results obtained in the case of men who had never been successfully vaccinated in their lives, as compared with the results obtained on men who had been successfully vaccinated at some time prior to their entry into the military service.

Of the eight men who had never been successfully vaccinated, and whose results by the intradermal

11. Knöpfelmacher, quoted by Force, J. N., and Beckwith, H. L.: A Laboratory Method for the Diagnosis of Smallpox, THE JOURNAL A. M. A., Aug. 14, 1915, p. 588.

12. Kolmer, J. A.: A Practical Text-Book of Infection, Immunity and Specific Therapy, Philadelphia, W. B. Saunders Company, 1917, p. 678.

method were unsuccessful, it was found by inquiry into their histories that seven had had smallpox, three of them having had it five years before, one one year before, one four years before, one eight years before, and one eighteen years before. Of the fifty-nine unsuccessful cases by the incision method in this same group, a history of smallpox was obtained in only seven instances.

TABLE 1.—UNSUCCESSFUL VACCINATIONS BY INCISION METHOD, AND RESULTS WITH INCISION AND INTRADERMAL METHODS

No. of Times Unsuccessfully Vaccinated in Army	Total Number Vaccinated	"Takes," Intradermal Method	"Takes," Incision Method	Unsuccessful Intradermal Method	Unsuccessful Incision Method
1	6	6	0	0	6
2	34	23	2	11	32
3	68	51	8	17	60
4	44	31	3	13	41
5	44	29	3	15	41
6	17	12	1	5	16
7	12	7	1	5	11
8	2	1	1	1	1
	227	160	19	67	208

Fig. 5 (No. 9472).—"Take" by both methods; eighth day after vaccination. Two sites of injection used. Man never vaccinated in civil life; three unsuccessful vaccinations since entry into the service.

Fig. 6 (No. 9473).—Vaccinoid by intradermal method; nothing by incision method; seventh day after vaccination. Last "take," twenty years before.

Fig. 7 (No. 9833).—Immunity reaction by intradermal method; second day after vaccination.

The course of the eruption as it occurs in primary vaccination by the intradermal method is similar in every way to the course as it occurs by all other methods, except for the arrangement of the vesicles, which form a circle around the site of virus deposition. The vesicles appear as a rule on the sixth day and become pustules on the seventh or eighth day. The vesicles are multicolor. The center of the circle of vesicles is depressed, and shows early scab formation. On the eighth or ninth day the circle reaches its maximum diameter, at which time it measures from 0.5 to 1.4 cm. After the ninth or tenth day the vesicles begin to dry up, and at the end of from twelve to fourteen days the vaccinated area is marked by a dark brown scab that is sharply circular in outline. This scab falls off in from eighteen to twenty-four days and leaves a sharply circumscribed reddish, circular depressed scar, which may or may not show foveation.

In revaccination "takes" by the intradermal method the vesicles become pustules on the sixth or seventh day, and the size of the circle of vesicles is smaller—their maximum diameters measuring from 0.4 to 0.9 cm.—than the size circles obtained in the primary vaccination cases.

One circle of vesicles surrounds each site of virus injection.

It is seen that the circular arrangement of the vesicles around the site of virus injection is a constant and characteristic feature of the method, and is the only difference to be noted. The virus produced evidence of its activity by vesicle formation only at points where the skin layers were but slightly separated, which explains the circular arrangement of the vesicles; the actual site of virus deposition is marked by the dark depressed central scab, which is due to the local necrosis produced by the mechanical and chemical injury to the skin at that point.

In none of these cases did any infection occur, and the local reactions in the severest cases were relatively mild as compared with the severe reactions that so often follow vaccination by the incision method.

In the cases of primary vaccination with no history of smallpox, the circle of vesicles was the same size in practically all of the cases, measuring approximately 1 cm. in diameter. In the cases with a history of smallpox, and also in the revaccination cases, the size of the circle or area of vesiculation varied in a most remarkable way according to the time that had elapsed since the attack of smallpox or the previous vaccination; the more recent the smallpox attack or revaccination, the smaller the circle of vesicles—a result that is not at all surprising because in all of these cases exactly the same amount of virus was introduced, and it seems only reasonable that the size of the area of vesiculation should vary in direct proportion to the immunity against smallpox that the person vaccinated possesses.

TABLE 2.—RESULTS ACCORDING TO SUCCESS OF PREVIOUS VACCINATIONS

	Total	Intradermal "Takes"	Incision "Takes"	Intradermal Unsuccessful	Incision Unsuccessful
Men never successfully vaccinated before	52	44	9	8	43
Men successfully vaccinated before	175	116	10	59	165

With this method it is possible to deposit a definite amount of virus of known strength in each instance; and, after having observed that a definite relationship exists between the size of the reaction area and the immunity to smallpox the injected person possesses as shown by his history, I am convinced that intradermal injections of vaccine virus will prove to be a most satisfactory and reliable method for the estimation of the relative immunity of individuals to smallpox, if a sufficient number of observations are made.

The arms of the sixty men on whom control injections of 0.2 c.c. of the glycerol-phenol solution were made showed at the end of twenty-four hours a small area of erythema, measuring about 2 mm. in diameter; while at the end of forty-eight hours all traces had disappeared. It is apparently clear, therefore, that the results obtained were due not to the irritant action of the glycerol-phenol solution on the skin, but rather to the activity of the virus itself, and also that pressure necrosis is not to be considered a factor in their production.

The amount of time required for vaccinating a large number of men by this method is slightly less than the amount required for vaccinating the same number by the incision.

The only disadvantage of the method is the relatively large amount of virus used in comparison with other methods. With 1 c.c. of virus it is possible to vaccinate from sixteen to 20 persons, while by most other methods 1 c.c. is a sufficient amount of virus for forty or fifty vaccinations.

CONCLUSIONS

1. This comparative study of 227 cases, with all conditions equal, shows that vaccination by the intradermal method gives a much higher percentage of "takes" than vaccination by the incision method, in a group of cases in which recent repeated vaccinations by the incision method had failed.

2. There is less chance for infection.

3. It is the only method by which a definite and known amount of virus can be deposited.

4. It may prove to be a method by which a fair index of the relative immunity of persons to smallpox can be obtained.

The virus used was furnished by the Board of Health, New York City, through the courtesy of Dr. W. H. Park.

Alimentary Dropsy.—An abstract in the *Correspondenz-Blatt* from the *Deutsche medizinische Wochenschrift*, 1917, No. 29, relates that numerous cases of "edema disease" had been encountered by the writers in prisoners' camps, at various times, and finally quite an epidemic developed in their service in a civilian hospital, and numerous cases were sent in from outside at the time. The elderly were in the majority, and the dropsy was the first symptom to attract attention. Considerable bradycardia accompanied the edema, but nothing pathologic on the part of the kidneys could be discovered. Under bed rest the dropsy subsided, and except for weakness for a time there were no further disturbances. They state that the epidemic occurred at a time when there was a scarcity of potatoes. Turnips and carrots were the mainstay. They were taken in the form of soup, sometimes three times a day. The diet thus contained ample carbohydrates and an excess of fluids, but too little fat. When the diet was improved, especially when potatoes became available, no further cases were seen.

CHLOROFORM ANALGESIA BY SELF-INHALATION AS ADAPTED FOR DRESSING WOUNDS *

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The needs of the war, especially the frequent dressing of painful wounds, have emphasized the desirability of a suitable, prompt, brief, safe, and if possible, pleasant method of anesthesia, or rather analgesia, especially such as could be given in the ward, without moving the patient. Full ether or nitrous oxid anesthesia is effective, but each has obvious drawbacks and limitations. They are too liable to produce nausea, and to upset the patient generally.

Several methods of meeting the problem have been suggested. L. J. Hirschman[1] describes a method used in British hospitals, consisting in the inhalation of a fixed dose of an ethyl chlorid-chloroform-ether mixture. Gwathmey and Karsner[2] describe a gastric method, consisting essentially of a solution of ether in liquid petrolatum.

The work reported herein had been planned and completed before the article by Gwathmey and Karsner had been published. Publication was delayed to permit the clinical trial of the method under war and base hospital conditions. This has now progressed far enough to show that the method is effective, convenient and apparently safe, although the deep-rooted fear of chloroform may tend to prevent its general adoption.

I would, however, disclaim the intention of reintroducing the use of chloroform for general anesthesia. The present method presents a specific technic, using a fixed dose for a specific purpose, namely, for analgesia only.

In approaching the problem, I aimed to avoid the gastric administration, since the narcosis produced by this method would be likely to be more persistent than is necessary for the purpose. It was also doubtful to me whether an effective dose could be given without nausea or more serious danger. Gwathmey and Karsner, however, have apparently disposed of that question.

The use of morphin or scopolamin would be excluded for similar reasons: effective doses would be too dangerous and too prolonged; safe doses would be ineffective.

It seems, on *a priori* grounds, that a brief and harmless, but adequate, analgesia could best be secured by the inhalation method, which introduces and eliminates the narcotic rapidly. The chief problem, therefore, appeared to be the evolution of a method of administration adapted specifically to this purpose; namely, one giving a rather superficial anesthesia, with perfect safety and comfort to the patient, and the minimum of technical difficulty of administration.

This pointed to the employment of "self-inhalation." This carries with it an automatic safety device, in that the patient will be unable to continue the adminis-

* From the Pharmacological Laboratory of the Western Reserve University School of Medicine.

1. Hirschman, L. J.: News of Base Hospitals in France, THE JOURNAL A. M. A., Dec. 1, 1917, p. 1882.

2. Gwathmey, J. T., and Karsner, H. T.: General Analgesia by Oral Administration, THE JOURNAL A. M. A., April 6, 1918, p. 993.

tration beyond the point at which consciousness is lost.

A method was devised of testing this administration on man, with various anesthetics and mixtures:

The presence and tolerance of pain was tested by touching the ordinary electrodes of a Harvard induction coil with the moistened tip of a finger, a strength of current being chosen such that the finger could not be kept on the electrodes normally by the exercise of an ordinary amount of will power.

The anesthetics were accurately measured in a conical graduate, taken up in a piece of cotton about the size of a lemon or larger, and held directly to the nostrils with the left hand of the subject. (Local irritation in all cases was negligible.) The subject then breathed deeply and quietly, occasionally testing the sensation.

Practically ideal results were secured by the use of 5 c.c. of chloroform, by this method. On several occasions the subject passed through the successive events of the ideal induction of anesthesia: the floating sensation, prickling, warmth, confusion, drowsiness; and in one case probably actual unconsciousness. In all the other administrations, the subject felt almost asleep, but gave answers to questions. The answers were appropriate, except when the effect was maximal, when they became incoherent.

The confusion began almost at once, and reached its maximum generally within five minutes. It began to lessen after about ten minutes. Then there remained a rather apathetic, drowsy state which disappeared only gradually: but inside of half an hour the subject was able to resume his ordinary occupations. There were no after-effects of any kind, except when the dosage was repeated in half an hour. In this case there remained some nausea and vertigo. The whole course of events is not in the least disagreeable, but rather seductive.

The analgesic phenomena are as follows: Within a few minutes after starting, about the time when the floating sensation occurs, the painful stimuli are very much less appreciated. The stimulation is quite distinctly felt, at first as a painful sensation; but the mind does not attach any importance to it, so that the finger can be kept on the electrodes without difficulty. As the narcosis deepens, the stimulation is felt as smarting rather than as pain. The analgesia reaches its maximum in about four or five minutes. At this time most of the chloroform has evaporated, and the sponge becomes almost dry; and from this time on the analgesia diminishes, but the tolerance to pain is still very definitely greater than normal for about half an hour.

The chloroform was more effective than any of the other anesthetics that were tried. This applies both to the analgesia and to the mental effect. It caused distinctly greater confusion, relaxation and sometimes at least a distinct pallor.

Next in efficiency to the chloroform came the Hewitt chloroform-ether mixture (chloroform, 2 parts; ether, 3 parts by volume). When 10 c.c. of this were inhaled, the effects approximated 5 c.c. of the chloroform fairly closely; but they were not quite so deep. Five c.c. of this mixture produced only a relatively slight effect. Ether itself in 10 c.c. quantity is too weak, although it produces slight analgesia quite rapidly. Billroth's A. C. E. mixture (alcohol, 1 part; chloroform, 2 parts, and ether, 3 parts), 5 c.c. is still weaker. I also tried the mixture stated as in use in the British hospitals for dressings, as described by Hirschman.[1] Ten c.c. of this acted scarcely stronger than the same amount of ether; perhaps a little more rapidly.

From these observations I would advise the clinical trial of the chloroform, in the manner that I have described, namely:

Five c.c. of chloroform are measured, soaked up in cotton, and given to the patient, to be applied by him in the palm of his hand directly to the nose, his hand excluding the air as much as possible. The patient should be directed to hold the sponge to the nose until the operation is completed. He should be instructed to breathe quietly and deeply. The dressing procedures can be begun between three and five minutes after starting the administration, and timed so as to be completed within twenty minutes.

The dose should be measured accurately, since any tendency to guesswork or leeway would eventually lead to fatalities. Indeed, it might be advantageous to dispense the chloroform for this purpose in single dose 5 c.c. ampules.

Repetition of the dose at the same sitting is to be avoided, but if absolutely necessary, the same dose may be given at the end of fifteen or twenty minutes, on a fresh piece of cotton. It is much safer, however, to abandon the use of chloroform in any cases in which a single dose is inadequate.

Inhalation from the hand was found much better than inhalation from a cup or similiar mask, because it brings the vapor much nearer to the nose.

It must be remembered that the chloroform used in this way does not usually produce unconsciousness; and so long as there is some consciousness the painful stimuli are felt. The object of the chloroform in that dosage is to produce a drowsy apathy, in which the patient in the first place feels the pain less, and in the second place is more indifferent whether he feels it or not.

The fact that the patient has his attention occupied by his doing something himself that lessens his pain is a rather desirable feature for distracting his attention from the proceedings of the dressers.

Clinical trial of the method has established its value for the purposes for which it was devised, namely, as a convenient and brief analgesia for dressings or minor surgical procedures. It has not yet been compared extensively with the Gwathmey-Karsner method in the same service. It is quite conceivable that the field of the two methods is somewhat distinct.

SUMMARY

The method proposed consists in producing analgesia by the inhalation of a definite quantity of chloroform (5 c.c.), measured as a single dose; and involving the use of the patient's hand as a tight inhaling mask. It has given good results, both experimentally and clinically.

Of the various anesthetics, chloroform is best adapted to this self-inhalation analgesia.

The fixed dose should be rigidly followed, or rather should not be exceeded. No attempt should be made to produce full anesthesia by this method.

Therapeutics

PROPHYLACTIC MEASURES TO BE OBSERVED IN MEASLES

An intelligent application of prophylactic measures in connection with measles demands that attention be paid not only to the possible transmission of the specific cause of measles from the infected individual to those about him, but also to the equally and sometimes more dangerous transmission of secondary infections to persons sick with or convalescent from measles from those who may or may not have the disease. The associated or secondary infection may be transmitted simultaneously with the measles virus, or may be transmitted from a second person to a person primarily infected with measles alone. Carriers probably play a larger part in the transmission of secondary infections than they do of measles proper.

PREVENTION OF THE SPREAD OF THE MEASLES VIRUS

Clinical and experimental evidence points to the presence of the specific cause of measles in the secretions of the respiratory tract very early in the disease, and prevention of infection of contacts can be hoped for only if the person coming down with measles is removed from his uninfected associates very early in the attack. This necessitates the early recognition of cases, which can be done by frequent examination of the mouths of those who have been or are suspected of having been exposed. The typical Koplik spots appear in the mouth from one to three days before the catarrhal symptoms develop and are readily detected by one familiar with them as minute, pearly white, pinpoint spots on the mucous membrane of the cheek, each being surrounded by a red halo. If persons are isolated at this time, the likelihood of their spreading the disease is much less than if they are undetected until the catarrhal symptoms have appeared.

ISOLATION

Measles patients should be isolated as soon as detected. If possible, each patient should be placed in a separate room. Because of the ease with which this disease is spread through minute moist droplets of infected mucus driven out into the surrounding air by coughing, sneezing, etc., measles patients should not be placed in a ward with persons suffering from other diseases. They should be placed in a ward by themselves, the individuals being separated from each other by the use of cubicles, the walls of which may be sheets suspended on wires. The latter precaution is directed toward the prevention of the transfer of secondary infections from one individual to others.

SECONDARY OR ASSOCIATED INFECTIONS

Infection of measles depresses the resistance of the body to a great variety of other infections, and the mortality associated with measles depends largely on the occurrence of secondary, complicating infections which accompany or follow the primary disease. The most common secondary infecting organisms associated with measles are tubercle bacilli, diphtheria bacilli, pneumococci and streptococci. Tubercle bacilli in a local, quiescent lesion are apt to take on fresh activity and to become widely disseminated during the course of and convalescence from measles. The mucous membranes in measles offer a peculiar vulnerability to diphtheria bacilli, and if this secondary infection occurs it is apt to exhibit unusual virulence.

Secondary infections by streptococci give rise to bronchopneumonia and empyema, and are responsible for most of the otitis media, endocarditis, pericarditis and pleuritis and other septic processes. The pneumococcus may cause lobar pneumonia.

Prevention of dissemination of these secondary infections from one patient to others is accomplished by isolation of individual patients in rooms or cubicles during the acute sickness. It is desirable to lessen further the chances for the spread of secondary infections by placing those patients with complications in separate wards from those occupied by simple cases. Patients with measles who are shown by bacteriologic examination to harbor hemolytic streptococci in the throat should be carefully separated from the other measles patients.

CONVALESCENCE

When patients are able to be out of bed and go about the ward and so come in close contact, the danger of transfer of measles has passed; but the danger of transfer of secondary infecting agents is often still present. The danger of spreading secondary infections during convalescence may be removed to a large extent by the wearing of proper gauze masks that cover the nose and mouth. The face mask not only prevents infections through droplets that pass directly from one patient to others, but it also prevents the escape of droplets that would fall to the floor or on other surfaces, and after drying might be distributed in dust. Unmasked convalescents should not be allowed to associate.

All eating utensils used by the sick should be sterilized by heat after each use.

ATTENDANTS

Those caring for measles patients should always employ aseptic technic, avoiding the carriage by any means of infectious materials from one patient to others. This necessitates great care in frequent cleaning of the hands with soap and water, the protection of the clothing by gowns, which are changed when soiled, and the covering of the hair by a suitable cap. For the personal protection of the attendants and in order that they may not become carriers of infectious agents, they should wear gauze masks when on duty.

DISINFECTION

While the measles virus is short lived outside the body and is readily killed by sunshine and abundant airing, this is not true to the same degree of the agents causing secondary infections. The latter bacteria, when dried in the secretions from mucous membranes, may retain their vitality and pathogenic properties for a considerable time. This renders necessary the sterilization of contaminated bedding and clothing. It also calls for washing of beds and cleaning of floors. If the latter are of such a nature as to be insusceptible of thorough cleaning by soap and water, they may be treated with an antiseptic solution at intervals.

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SATURDAY, AUGUST 24, 1918

"SPANISH INFLUENZA"

According to current reports, a pandemic of an acute influenza-like disease is passing over Europe, civilized and barbarian. Fortunately the outbreak in England and among the Allied troops on the continent is now on the wane. The disease has been called "Spanish influenza," presumably because it is believed to have started in Spain. In view of the likelihood that the pandemic will reach this country, all observations in regard to its manifestations and nature are of special interest. Thus far, however, most of the articles and notes regarding the disease have been of an ephemeral nature; the more elaborate and finished studies will come later.

The symptoms are described practically always in about the same terms: sudden onset with chills, severe headache, pains in the back and elsewhere, general malaise, flushed face, some soreness of the throat, and fever of from 101 to 104 F., with a rather slow pulse. Usually crisis has occurred after two or three days, with rapid and complete recovery. In many cases there has been a harsh cough with a scanty sputum; occasionally more severe bronchitis and even bronchopneumonia have developed; but among the young and healthy there seem to have been no serious consequences, and no definite statements are made as to the death rate, which in any event thus far has been very low. Gastro-intestinal disturbances have not been observed. Herpes labialis is mentioned as occurring occasionally. Enlargement of lymph nodes is recorded. At the end of the fever there has been found a rather slight leukocytosis, with a relative excess of small lymphocytes, preceded according to some by leukopenia with marked fall in eosinophils.

The observers on whose authority these statements are ventured do not agree as to the bacteriology of the disease. Little, Garofalo and Williams[1] of the Canadian Army Medical Corps did not find any influenza bacilli in smears or in cultures from the nose, throat and sputum. They found the predominating organism to be a small coccus with many of the characteristics of the streptococcus, but with rather feeble hemolytic power. Gotch and Wittingham,[2] on the other hand, found a gram-negative coccus, which they speak of as *Micrococcus catarrhalis*, in the nasopharyngeal swabs and sputum of all of fifty cases, sometimes almost pure; further, influenza bacilli in culture in 8 per cent. and influenza-like bacilli in smears in 62 per cent. of the cases, and also other bacteria, such as pneumococci and streptococci, in fewer instances. The experimental implantation of pure cultures of the *Micrococcus catarrhalis* on the pharyngeal mucous membrane was followed by the symptoms of influenza in two persons; hence Gotch and Wittingham regard this coccus as the cause of the disease, either acting alone or in conjunction with the influenza bacillus. As they give no details in regard to their experimental inoculation, it is quite impossible to form any judgment as to its value. Blood cultures have not yielded any definite results and so far no immunologic tests seem to have been made. In editorial comment, the *British Medical Journal*[3] states that the influenza bacillus has been found in many different places, especially in cases with bronchitis and pneumonia, and that the general opinion seems to be that the pandemic is due to the bacillus. This opinion is by no means unanimous, however, and the bacteriologic and other evidence at hand certainly does not warrant its acceptance. Much further work is required before we can feel sure that we understand the true nature and cause of this and similar pandemics.

The treatment remains symptomatic—rest in bed, free movements of the bowels, and light diet are the most important measures. No doubt the spread of the infection, whatever it is, would be limited considerably if the dangers of droplet infection were recognized more widely and guarded against.

1. Little, T. H.; Garofalo, C. J., and Williams, P. A.: The Absence of the Bacillus Influenzae in the Exudate from the Upper Air Passages in the Present Epidemic, Lancet, London, 1918, **2**, 34.

2. Gotch, O. H., and Wittingham, H. E.: A Report on the "Influenza" Epidemic of 1918, Brit. Med. Jour., 1918, **2**, 82.

3. The Influenzal Pandemic, Brit. Med. Jour., 1918, **2**, 39; The Pandemic of Influenza, ibid., 1918, **2**, 91.

INORGANIC ELEMENTS IN NUTRITION

There are twelve elements that occur in the human body in more than very minute quantities. By far the larger proportion make up what are commonly termed the mineral salts or inorganic components of the organism. Their presumable importance for the proper performance of our functions and the resulting welfare of the individual was recognized even in the days of Liebig. When it is recalled that under average conditions of diet and activity a healthy man may excrete daily from 20 to 30 grams (as much as an ounce) of inorganic salts, chiefly in the form of chlorids, sulphates and phosphates of sodium, potassium, magnesium and calcium, the relative magnitude of the ordinary "mineral metabolism" becomes evident.

After all, there is still great paucity of information on this aspect of nutrition. Osborne and Mendel[1] recently summarized the situation by stating that although there is almost a unanimity of opinion regarding the energy needs of the body under different circumstances of age and activity; although the current estimates of the minimum amount of protein required each day seem to be defined within reasonably narrow limits; and although the functions of fat and carbohydrate and the possibilities of their interchange are beginning to be understood, there is no adequate experimental basis to permit tenable statements regarding either the indispensability or the minimum requirement of any of the inorganic constituents of the dietary, with the possible exception of calcium and phosphorus. Statistics show enormous divergences between the mineral intakes of people in different regions; but these appear to be the fortuitous results of widely varying dietaries, including water (as is the comparative dissimilarity in the fat and carbohydrate content of the diets of peoples living, respectively, in a tropical or frigid climate—differences enforced by the different character of the available food supplies), rather than the expression of unlike metabolic needs.

Of course, this problem of the inorganic nutrients is as important for animal husbandry as for human nutrition; perhaps even more so in the case of domesticated animals deprived of a free choice of feeds and forced to live on selected rations. In this indirect way, again, the production of our own food supply is involved. Hart, Steenbock and Fuller[2] pointed not long ago to the prevailing idea that the mineral nutrients are contained in abundance in our feeding materials, and that therefore studies of their supply in feeds and the demand by farm animals are of little practical importance. It must be borne in mind, however, that grains in general are deficient in calcium. Agriculturists tell us that rations wholly made up of grains will supply to the growing animal an amount of calcium dangerously near a critical level of intake. Ruminants and horses consuming the usual roughages which contain more lime will ordinarily receive calcium enough for growth. But the Wisconsin experts[2] have announced that swine, growing or breeding, and confined wholly to grain rations, should receive an additional supply of calcium either as calcium carbonate, calcium phosphate, or legume hay. Like other workers in this field, they have pointed out that for continued and high milk production, with its extra drain of calcium, the supply may be dangerously low unless calcium is furnished in other forms.

A considerable volume of evidence from independent sources has placed beyond question the fact that the organism is not dependent on so-called natural sources for its supply of lime. There is no doubt that even growing organisms can utilize the element from such simple compounds as calcium carbonate or phosphate. Similarly, inorganic phosphates can serve as a complete source of phosphorus for the life cycle. This deserves repeated emphasis in the face of continued attempts to postulate indispensable nutrient virtues in special forms of "naturally occurring" phosphorus derivatives.[3] Furthermore, the limits of stature and form are fixed by heredity in large measure, so that, in the experience of Hart, Steenbock and Fuller, high calcium rations, as compared with low calcium rations, had no effect whatever during a single gestation period on the size or calcium content of the skeleton of the fetus. The skeleton is not increased in any dimension by a wide variation in the amount of calcium fed the mother.

Osborne and Mendel[1] likewise find that the appropriate supply of calcium, phosphorus and iron must be clearly kept in mind — a point that Sherman has repeatedly brought into public prominence in relation to human nutrition. In the case of other elements, sodium, potassium, magnesium and chlorin, they have observed in animal experiments that the minimum requirement is apparently much smaller than is currently believed. Even on diets rendered as free from these elements as ordinary care and selection will permit, Osborne and Mendel observed growth and long continued maintenance in health. This may seem surprising to those who look on a large modicum of common salt as a necessity. But it has long been known that the organism can endure a considerable reduction in the customary intake of sodium chlorid without any obvious untoward effects. There seems to be an extraordinary capacity for adjustment to varying quantities of this salt. When an abundance is offered in the diet, the elimination of chlorids through the kidneys, which are the only significant path for their excretion, is large; on a restricted chlorid intake the output promptly falls (except, perhaps, in certain cases of pathologic "salt retention"). In starvation, the output does not continue at a low level, as is the case with some of the other inorganic elements and nitrogenous wastes, but sinks almost to zero. The chlorid is husbanded in the body when its supply is limited.

What applies to chlorin is presumably true of some of the other elements, like sodium, potassium and magnesium. That these to some degree may be essential to the adjustments of neutrality regulation is indicated by the failure to grow when both sodium and potassium were practically excluded from the diet, whereas growth was nearly or quite normal when only one of these elements was missing. It is evident

1. Osborne, T. B., and Mendel, L. B.: The Inorganic Elements in Nutrition, Jour. Biol. Chem., 1918, **34**, 131.

2. Hart, E. B.: Steenbock, H., and Fuller, J. G.: Calcium and Phosphorus Supply of Farm Feeds and Their Relation to the Animal's Requirements, Research Bull. 30, Wisconsin Agr. Expt. Sta., February, 1914.

3. The Nutritive Value of Inorganic Phosphates, editorial, THE JOURNAL A. M. A., April 20, 1912, p. 1198; Organic and Inorganic Phosphorus Compounds, May 25, 1912, p. 1605; Organic Phosphorus Compounds, June 21, 1913, p. 1958.

that a readjustment of the points of view in this connection will soon be necessary. Not only calories and protein, vitamins and roughage, but even the individual elements need specific consideration in nutrition. What next?

THE MEASUREMENT OF MUSCULAR STRENGTH

Man power has always been an important factor in the work of the world; hence it is truly surprising that so little success has been attained in the measurement of human strength. Exercise is everywhere admitted to be an essential to good health and efficiency, yet science is far from having a suitable knowledge of the physiology of exercise. Despite the formulation of so-called strength tests, no scheme which will permit a forecast of the probable maximum strength of an individual and an analysis of observed departures from expectation has until recently existed.

In connection with a study of the treatment of infantile paralysis, Lovett and Martin[1] have developed a method of estimating muscular strength. This is not a simple matter. Martin[2] has pointed out the complications. Effective muscular strength, he says, by which is meant the power developed at the actual points at which strength is ordinarily exerted, depends on a number of factors. The muscles work for the most part in groups, and through action on levers. The effective strength, for example, of the calf muscles in such an action as rising on the toes has a complex mechanical basis, in comparison with the absolute muscular force of the isolated gastrocnemius. Moreover, in exhibitions of voluntary muscle power, the mechanism involved is a neuromuscular one in which the nervous part may have as much hand in determining the degree of activity as the purely muscular. Thus, so far as the actual use of the muscles is concerned, effective strength rather than intrinsic muscle power is of significance.

The collection of dependable data on this feature of the individual will serve toward the establishment of "quantitative standards of physiologic activities," surely a desirable end. Martin's extensive records of strength tests on children have shown that calculations of entire strength based on tests of only part of the muscle groups in the body are valid within a reasonable margin of error. In harmony with earlier findings of Kellogg on adults, relatively little difference in strength between the two sides of the body could be discerned. The data show a striking constancy in the relation of strength to body weight, when the sexes are considered separately. The fixed ratio of strength to weight is interpreted by Martin as signifying that the effective strength, as manifested in volitional efforts, depends, in the absence of specific exercise effects, on the constantly operative factor of weight, either of the entire body or of the part moved by a particular muscle group. The possession of means for obtaining information regarding the ideal distribution of strength among the muscle groups, to quote Martin, may enable us to interpret and perhaps to regulate departures from the ideal due to special exercises or to particular habits. On such a basis alone can the best prescription of exercise be based and measured.

1. Lovett, R. W., and Martin, E. G.: Certain Aspects of Infantile Paralysis, The Journal A. M. A., March 4, 1916, p. 729; Am. Jour. Orthop. Surg., 1916, **14**, 415.
2. Martin, E. G.: Muscular Strength and Muscular Symmetry in Human Beings, Am. Jour. Physiol., 1918, **46**, 67.

"THE DAY'S FOOD IN WAR AND PEACE"

Not infrequently one hears, in reproach of modern science in America, that it fails to do its greatest service because the lessons it brings and the discoveries it has to offer are rarely presented in a language that the public at large can comprehend. It is doubtless true that the scientific disciplines of today have developed a special nomenclature that tends to puzzle all but the trained specialist. This progressive enrichment—perhaps some would regard it as an encumbrance—of our vocabulary has by no means, however, been confined to the domain of scientific knowledge. The advances in the arts and the introduction of new inventions have likewise compelled the mastery of new or unfamiliar words to describe innovations that are rapidly engrafting themselves on our daily lives. The telephone, the automobile, the aeroplane and harvest machinery, among dozens of other devices, have added new terms which soon become permanently established in word and thought.

As an illustration of the injustice of applying the indictment of incomprehensibility to the popular literature of science—not of pseudoscience or quackery—in general, we may point with some enthusiasm to a recent compilation issued by the U. S. Food Administration. Under the caption "The Day's Food in Peace and War" it has published a collection of "lessons" prepared at the request of the Woman's Committee of the Council of National Defense by experts of the Department of Agriculture, the Food Administration, and some of our well known specialists. The names speak for themselves: Herbert Hoover has written on food and the war; Graham Lusk, on food for a day; Alonzo Taylor, on wheat: why to save it—how to use it; E. V. McCollum, on conservation of fats and sugar; C. F. Langworthy, on meat and meat substitutes in war time; Lafayette B. Mendel, on milk and its products; Caroline Hunt, on how to use fruits and vegetables; Charles J. Brand, on the use of locally grown products and the development of a near-by food supply; Ruth Wheeler, on the children's food. In an introduction, Ida M. Tarbell well remarks: "To learn to do every common thing in life in the most scientific manner is one of our high

duties at the present moment; but learning to meet our great need now will do much to help us as a nation in the future to do these common things in a finer and more comprehending way." If this war time booklet has not struck a timely pitch in driving home the modern lessons of nutrition, we fear that the popularization of science must be given up as a hopeless task for the present.

"The Day's Food" is not so elementary, despite its lucid style, that it will not repay examination by every physician who gives heed to the problems of diet and by every dietitian who aims to do full duty under present-day conditions. Here we find the essentials of a healtful and palatable diet clearly and succinctly indicated. "If Mother Goose had been born later in the history of the world," Graham Lusk writes, "she would undoubtedly have made a rhyme about calories, so that from early childhood we would have learned that our lives are dependent upon the fact that we burn up food in our bodies. . . . The laboring man, who does the hardest work, is the greatest consumer of food. He really needs to know the relative cost of the different fuels he eats, . . . but he has not been at all likely to get any information on the subject." In another lesson we are taught comprehendingly that wheat is just one of the cereals and there is no evidence that it is the most wholesome. Again, we are reminded that the principal reason for using sugar is that we like its taste and it makes other foods more palatable. It does not supply any necessary substance which cannot be secured equally well in other ways. The timely topic of meat, which though not actually necessary is a desirable part of the diet, is presented with forceful simplicity. The dietary virtues of milk, so often praised in THE JOURNAL, are reiterated in the lessons with cogent reasons for the advice given. An exceptionally sane chapter on feeding children defends the thesis that there is a real danger in attempting food conservation with them without such a knowledge of food as will show what changes may be safely made. There are no "frills" in the advice given. "A young child may be considered well fed if he has plenty of milk, bread, and other cereal food; an egg once a day or its equivalent in flesh foods; a small portion each of carefully prepared fruits and vegetables, with a small amount of sweet food after his appetite for other foods is satisfied. If there is too much or too little of any of these, his diet is one sided."

To make "The Day's Food" practical from the housewife's standpoint, illustrative tested recipes are introduced freely. For the inquisitive reader selected bibliographies are appended. The propagandist even finds a list of illustrative lantern slides to help him in his ventures. The inclusion of the entire monograph in current books on dietotherapy would be a valuable asset for their increased usefulness.

Current Comment

DOUBTFUL VALUE OF IRISH MOSS AS A FOOD

In a recent issue of THE JOURNAL,[1] we quoted an item from the government commerce reports which inadvertently gave the impression that carrageen, or Irish moss, if methodically collected and properly used, would help in augmenting the food supply of those nations where this sea weed, *Chondrus crispus*, is available in any abundance. The dried "moss," from which preparations termed vegetable gelatin and sea moss farina have been prepared and exploited commercially as human foods, contains a large proportion of a carbohydrate soluble in hot water and gelatinizing with ease on cooling. This has been demonstrated to consist in large measure of galactan, a polysaccharid yielding the sugar galactose, $C_6H_{12}O_6$, on hydrolysis with acids. In this respect it is analogous to the carbohydrate basis of the widely known agar agar prepared from a species of *Gelidium* growing abundantly in the warm waters of the Far East. To the chemist who analyzes these products they disclose the characteristics of a potential food because they readily yield a physiologically available sugar, just as the starch, or highly complex carbohydrate of the cereal grains, easily gives rise to the sugar glucose. But physiologic analysis shows that whereas the human organism produces enzymes or digestive ferments which can convert starch into sugars and thus prepare it for utilization in the organism, the galactans of Irish moss and agar agar are not digested in this way in the body. We produce no enzymes that convert the galactose-yielding complexes into the simpler fragments that can be assimilated; hence the carbohydrates of Irish moss, like those of agar agar, traverse the body unchanged in the alimentary tract.[2] Adequate digestion is a prerequisite for the suitability of a food in nutrition; and the carbohydrate in question fails to meet this requirement. The nitrogenous matter in the product has never been investigated sufficiently to justify any pronouncement in its favor. A somewhat similar error of judgment in respect to food values has lately become widespread in regard to the value of the Jerusalem artichoke as a war-time food. The cultivation of the plant has even been urged as a conservation measure.[3] This plant—topinambur—is rich in the carbohydrate inulin, a levulan easily converted into fruit sugar or levulose by hydrolysis with acids. However, the digestive juices do not appear to contain any enzyme capable of digesting inulin by converting it into an available sugar. The possibility of its physiologic use is limited to such conversion as the weak acidity of the gastric contents may effect. Hence inulin and products which furnish it in abundance have a limited food value so far as

1. Irish Moss as a Food, THE JOURNAL A. M. A., Aug. 10, 1918, p. 424.
2. Swartz, Mary D.: Nutrition Investigations on the Carbohydrates of Lichens, Algae and Related Substances, Tr. Connecticut Acad. Arts and Sciences, 1909, **16**, 247.
3. Cockerell, T. A.: Artichokes as Food, Scient. Month., March, 1918; abstr., THE JOURNAL A. M. A., March 30, 1918, p. 909.

this carbohydrate is concerned.[4] As we have repeatedly pointed out, the chemist's analysis of a supposed food must nowadays be subjected to the critique of physiologic interpretation.

MEDICAL EDUCATION IN ILLINOIS

In 1906-7, when the first inspection of medical colleges was made by the Council on Medical Education, it was found that conditions in Illinois were worse than in any other state in the country. Of fourteen medical colleges then existing in Chicago, only four could be included among acceptable institutions; three were in the class needing certain definite improvements; while in seven the conditions were so bad that a complete reorganization was considered essential to make them acceptable. Even in 1910, following the investigation made for the Carnegie Foundation for the Advancement of Teaching, Mr. Flexner, in his report, referred to Illinois as the "plague spot of the country in respect to medical education." Under the publicity given to these conditions, five of the lower grade institutions in time became extinct and a sixth sought refuge by merging with another. One of the schools which closed—the National Medical University—did so only after the State Board of Health in 1909 had withdrawn recognition from it. Three years later an institution of similar type—the Chicago Hospital College of Medicine—was organized. While apparently having no direct connection with the National Medical University, it adopted many of the methods of that institution: It offered courses mainly during the afternoon and evening hours; in its advertising circulars it offered a "free European trip" to students who should meet certain conditions, and it made it appear that its interests were mainly in "the poor boy who wanted to get an education." At the same time, however, it charged fees much in excess of those charged by several of the state universities which were fully equipped in every way and which are recognized by all state licensing boards. From 1914 on, the Chicago Hospital College of Medicine has been reported as not recognized by the licensing boards of over 30 states—the number varying from 32 to 37 states—and finally in June, 1917, recognition was withdrawn from it by the Illinois State Board of Health. Since that time the Department of Registration and Education has made repeated inspections of the school, one of which was in company with representatives of the Surgeon-General of the Army, at whose request the investigation was made. Following this investigation, the college was not included by the Surgeon-General among "well recognized medical colleges," and the Illinois Department of Registration and Education refused to restore recognition. The rank and file of the medical profession of Illinois, and all citizens who believe in the enforcement of reasonable educational standards in the training of physicians, will rejoice in the better control of medical education and licensure that has been established in the state. Illinois shows promise of again assuming the leadership that it held in the days of John Rauch, in safeguarding the public against diploma mills and quack doctors.

4. Lewis, H. B.: The Value of Inulin as a Foodstuff, The Journal A. M. A., April 20, 1912, p. 1176.

LET THE READER KNOW

In the latest number of that excellent publication the *American Journal of Syphilis* there appears an article under the title "On the Use of American-Made Salvarsan." The sum and substance of the article is to the effect that the arsphenamin product sold "under the trademark name of salvarsan by the H. A. Metz Laboratories" is in all respects the equal of the German-made product. It is, in effect, a puff for Metz's arsphenamin. The article is by H. Sheridan Baketel, M.D.* The reader is informed, under the caption, that Dr. Baketel is "Professor of Preventive Medicine and Hygiene and Lecturer on Genito-Urinary Diseases and Syphilis in the Long Island College Hospital; Genito-Urinary Surgeon to the House of Relief of the New York Hospital; Major, Medical Reserve Corps, United States Army." One thing, however, the reader is not told, and yet it is of prime importance if he is to appraise this article correctly, viz., that Dr. Baketel is, or was until quite recently if he is not still, in the employ of the H. A. Metz Laboratories (the present name of the Farbwerke-Hoechst Co.), and has for some time been the manager of the pharmaceutical department of that concern. Whether or not Dr. Baketel's conclusions are correct is beside the question. The point is that when an article appears in a scientific publication extolling the virtues of a proprietary product it is only common fairness to the readers of that publication that they should know that the article originates from those who have or have had economic as well as scientific interest in the preparation discussed. One other point, while irrelevant, is worthy of notice: Dr. Baketel says: "Salvarsan, on account of the complexity of its manufacture, has been exceedingly difficult to reproduce, but that this has been successfully accomplished is manifested by the production of this arsenical preparation under the trademark name of Salvarsan by the H. A. Metz Laboratories." This statement, especially when taken in connection with the claims made for the Metz product, might easily lead to the inference that the Metz concern is the only one that has successfully reproduced the drug. As a matter of fact, arsphenamin was made in this country by the Philadelphia Research Laboratories at a time when the Metz concern could not make it and when, indeed, that company had to buy it from them. It is hardly conceivable that Major Baketel does not know this.

Nutrition.—To the trained eye, the general appearance of the child may reveal much that is hidden to the mother. The posture, the tissue turgor, firm resistant subcutaneous tissues speak for health; flabby, nonresistant ones for malnutrition. The expressionless, tired looking children, with circles about the eyes, need to have their diets revised, or else have grave disturbances of health. Cyanosis of the cheeks, ears and finger tips may speak of cardiac or pulmonary disease. The bony changes in the skull of rachitic children are recognized at a glance. Disproportion between various skeletal members may reveal achondroplasia or other structural deformity.

Medical Mobilization and the War

Flight Surgeons Appointed

The United States government is now appointing a corps of surgeons and physical directors large enough to keep each training field and camp for flyers, both here and in France, with a proper organization. This medical branch of the air service does not alone select the flyer, but cares for him after he has been admitted to the service. Subject to the approval of the commanding officer, the flight surgeon recommends for the flyers such measures as periods of rest, recreation and temporary relief from duty as may seem advisable, attends sick calls of aviators, visits hospital cases and consults with the attending surgeon regarding them. The physical directors act as assistants to the flight surgeons and supervise such recreation and physical training of the flying men as is considered necessary.

Venereal Disease Control

The federal government will expend a million dollars, through the state boards of health, on venereal disease control during the fiscal year ending June 30, 1919. An officer of the U. S. P. H. S. will have charge of the work in each state in cooperation with the state health officer. The activities will be as follows: securing of reports of venereal infections; control of those infected, so as to prevent further spread of the diseases; establishment of free venereal clinics; suppression of vicious conditions that favor the spread of venereal infections, and carrying out of a systematic educational program for the general public as well as for those who are infected. The same act of Congress that made available this sum for expenditure gave authority for the establishment of a new division in the Public Health Service, to be called the division of venereal diseases, and also granted authority to the Public Health Service for the regulation of the interstate travel of venereally infected persons.

Committee Recommends Medical Examinations for Workers

A conference under the auspices of the national subcommittee on welfare work of the committee on labor of the Advisory Commission of the Council of National Defense has reported through Samuel Gompers to Secretary William B. Wilson of the Department of Labor that at its last meeting the committee recommended that medical examinations of workers be one of the functions of the government labor recruiting agency, recommending also the establishment of a central examining board to issue cards indicating the health of workers, and classifying them according to physical fitness. This proposed central examination board is to be composed of representatives of the workers, employers and the government, and the committee suggests that such men be placed on these boards as have the confidence of the workers in the locality in which they are appointed—especially should this be done in important cities like New York, Philadelphia, Chicago and Boston. It was also recommended that another board be appointed to hear appeals that might be made from the decisions of the local board, and that one member of each local board be a physician. This health examination by the government would not prevent the employer from making supplementary examinations and pursuing curative methods after placing men where they may be safely used; but it is the opinion that the official examinations made by the government would decrease about 50 per cent. of the grievances resulting when these examinations are conducted by employers. It is also believed by the conference that these examinations will aid in the detection of communicable diseases and will be of great benefit in placing subnormal employees in occupations fitted to their peculiar conditions.

Women Needed as Reconstruction Aides in Occupational Therapy

Trained women as teachers in occupational therapy are needed immediately for service in military hospitals, about 1,000 being desired for overseas service within the next few months. These reconstruction aides will teach hand crafts and other subjects to disabled soldiers in the military hospitals. The qualifications for this service are: age, between 25 and 40; citizens of the United States, or subjects of the allied countries; physical fitness; height not less than 60 inches nor more than 70; weight, not less than 100 nor more than 196 pounds; a thorough general education, at least the equivalent of graduation from a secondary school—college graduates preferred; an expert in some line. These aides will be divided into three classes: aides, head aides and supervisors, one head aide being responsible for the work of every ten aides, and a supervisor being appointed where there is need for more extended supervision. The salary of the aides will be $50 per month for service in the United States, and $60 for service abroad, the head aides receiving $15 additional. Transportation and $4 for other traveling expenses are also provided. For service at home a hospital uniform is required; for foreign service both hospital and street uniforms are needed. Women qualified for the service are requested to send applications at once to the Office of the Surgeon-General, Attention Division of Physical Reconstruction, Washington, D. C.

Conference of Local Board Examiners of New Mexico and Medical Officers of Camp Cody

In the operation of the Selective Service Law there have arisen, from time to time, various differences of opinion. This may be particularly true in respect to decisions involving medical questions. In order to forestall any contingency of this sort arising in New Mexico, Governor Lindsey, with his medical aide and the executive officer of the Selective Service Law, evolved the unique scheme of having a series of conferences between the examiners for the Local Boards and the medical officers of Camp Cody. Proposing this scheme to the division surgeon, Lieut.-Col. Coffin, he perceived the possibilities and ordered the arrangements made.

A feature of the camp is the "Developmental Battalion," numbering approximately 1,200 men. In this battalion are put the selected men who are borderline cases, mentally and physically. An attempt is here made to make these men fit for military service through the agency of mental and physical education.

It is stated that this is probably the first meeting of this nature which has taken place in the United States. The correlation of ideas as to when a man is or is not fit for military duty is of aid in preventing the return of men to their local boards as unfit.

The program which covered four days included: July 24, 1918—presentation of members to the division surgeon; sick rate charts shown, compared and discussed; inspection of casual camp infirmary, contact camp and base hospital; smoker. July 25, 1918—presentation of members to the commanding general; demonstration of field hospital and ambulances; inspection of development battalion, with presentation of cases; "Physical Disability in Relation to Mental Attitude Toward Military Service," Major E. S. Bullock; "Nervous and Mental Diseases, with Presentation of Cases of Hyperthyroidism," Major Horace Philips; "Psychologic Conditions," Lieutenant Moore; bayonet drill; conference. July 26, 1918—"Physical Diagnosis in Chest Conditions," Captain Thorburn; "Cardiovascular Conditions," Major Carter; "Review of 109th Sanitary Train," Lieutenant-Colonel Pederson, commanding; smoker, given by the 109th Sanitary Train. July 27, 1918—"Eye, Ear, Nose and Throat Conditions," Lieutenant Reeder; "Bones, Joints, Varicose Veins and Hernia," Lieutenant Husser; "Venereal Diseases and Skin," Captain Bowman.

PLANS FOR PHYSICAL RECONSTRUCTION OF DISABLED SOLDIERS IN THE GENERAL MILITARY HOSPITALS

Institutions Where Rehabilitation Work Will Be Carried On—Treatment to Be Employed and Vocations Taught

The following statement is authorized by the War Department:

The Surgeon-General, with the approval of the General Staff, announces the completion of plans for the physical reconstruction of disabled soldiers in the general military hospitals. These plans are formulated with a view to close cooperation with the War Department committee on education and special service in the work of restoring men to full or limited military service, and with the Federal Board for Vocational Education, which is authorized by the law to

provide vocational training for disabled men after their discharge from the Army and Navy.

The records of 516 cases treated in four hospitals show 134 men able to return to full military duty, 210 fit for limited service, 172 who are eligible for discharge. In the last group 12 are classed as helpless or institutional cases, 121 are able to return to their former occupations, and 39 will need further training to fit them for earning a livelihood. These figures show the division of responsibility in the work of reconstruction.

MOST PRESSING NEED

The task of fitting men for further military service is at present the most pressing need because wherever an able-bodied man behind the lines can be replaced by one less fit physically, but vocationally capable, a soldier is gained for active duty. The reconstruction work in the hospitals, therefore, will emphasize technical training in all lines capable of adaptation to the physical limitations of disabled men and in which employment will act as a therapeutic agent. When play and work and study will help a man to get well, this kind of medicine will be prescribed to the patient. If the work he does leads to further service in the Army or to better prospects in civilian life so much the better.

HOSPITALS DESIGNATED

The Surgeon-General has designated the following general military hospitals for the work of physical reconstruction:

Walter Reed General Hospital, Washington, D. C.
General Hospital No. 2, Fort McHenry, Md.
General Hospital No. 3, Colonia, N. J.
General Hospital No. 6, Fort McPherson, Ga.
General Hospital No. 7, Roland Park, Baltimore (for the blind).
General Hospital No. 8, Otisville, N. Y.
General Hospital No. 4, Fort Porter, N. Y.
General Hospital No. 9, Lakewood, N. J.
General Hospital No. 11, Cape May, N. J.
General Hospital No. 16, New Haven, Conn.
General Hospital No. 17, Markleton, Pa.
Letterman General Hospital, San Francisco.
United States Army Hospital, Fort Des Moines, Iowa.
Plattsburg Barracks Hospital, Plattsburg Barracks, N. Y.
General Hospital, Fort Bayard, N. M.

POLICY TO BE FOLLOWED

The policy to be followed in these hospitals, as announced by the Surgeon-General, is that hereafter no member of the military service disabled in line of duty, even though not expected to return to duty, will be discharged from service until he shall have attained complete recovery or as complete recovery as may be expected when the nature of his disability is considered. In furtherance of this policy, physical reconstruction is defined as complete mental and surgical treatment carried to the point of maximum functional restoration, both mental and physical. To secure this result all methods recognized by modern medicine as conducive to cure will be utilized. In other words, not only the ordinary means of medicine and surgery, including all specialties, will be utilized, but also physical measures such as are employed under physiotherapy, including hydro, electro, and mechanotherapy, active exercises, indoor and outdoor games and passive exercise in the form of massage. Provision in the form of adequate buildings and equipment for physiotherapy have been adopted in each of the hospitals.

FUNCTIONAL RESTORATION FINAL AIM

Modern medical treatment does not end with physical cure. Functional restoration is the final aim of the modern physicians and surgeons. It is conceded that the physical rehabilitation of disabled men is peculiarly dependent on their mental attitude. The more serious the disability, the greater the danger of mental depression, and an indisposition to respond to medical and surgical treatment. The educational work should begin, therefore, at the moment when the man has arrived at the stage where he begins to worry about his future, whether in this country or overseas. The first problem is to divert his attention by simple recreation, through reading, pictures, games, handiwork occupations, and the like, with a view to securing a genuine interest in the attainment of some worthy end—the end most certain to hold his attention and to claim his best efforts in his future vocation. Hence, by gradual steps he may be induced to supplement his previous vocational experience by academic, scientific, or technical instruction, or to choose a new vocation and begin preparation for it if such a course is necessary.

NEED OF "CHEER-UP" WORK

The need of "cheer-up" work in the hospitals extends to all who are mentally capable of planning for their own future. This means a relatively large proportion of the entire number. The beginning is made at the bedside with handicrafts of various kinds grouped under the term "occupational therapy." When the man is able to leave the ward and can be benefited physically by technical training, he has the opportunity of working at specific trades either in the curative work shop, in specially provided classrooms, or out of doors.

The teachers for this work have been secured from the convalescent disabled soldiers who are already skilled in their vocations and from the enlisted personnel of the Army secured by transfer or by induction of registrants disqualified for general military service, but qualified for special limited service. These instructors work under the direction of educational officers chosen for their professional standing in civil life and commissioned in the Sanitary Corps of the Medical Department. The General Staff has just authorized commissions for 119 educationel officers for this purpose.

THREE CLASSES OF DISABLED SOLDIERS

From the military standpoint disabled soldiers may be placed in three general classes:

(*a*) Those who can be restored to full duty.
(*b*) Those who can be fitted for limited service.
(*c*) Those disabled to the extent of unfitting them for further military service.

It is the announced policy of the Surgeon-General that patients of the first class (*a*) should have, when circumstances warrant it, the benefit of therapeutic treatment through play, work and study, as may be prescribed by medical officers, in order that their morale may be stimulated, their special skills improved, their future usefulness increased, and their recovery hastened.

Patients of the second class (*b*) should have, whenever conditions permit and the medical officers approve, such specific training—physical and vocational—as will in the judgment of the educational officers best fit such patients for limited service of a particular kind. At present patients are being trained in general hospitals for limited service as general and vocational teachers, typists, printers, tailors, cobblers, harness makers, welders, motor mechanicians, painters, machine workers, woodworkers, bookkeepers, statisticians, telegraphers, photographers, telephone operators, cooks, storekeepers, electricians, etc.

LIST TO BE EXTENDED

The list will be extended with the advice and cooperation of the committee on education and special service of the War Department to meet other needs as they arise. In connection with the large general hospitals there is abundant opportunity for practice in many trades and occupations. At Fort McPherson, for example, practical experience can be gained in twenty different trades. Moreover, there is immediately adjacent to the hospital a large quartermaster's mechanical repair shop, covering all phases of mechanical repair and construction to which men can be assigned for limited service or to gain experience.

Patients of the third class (*c*) should be encouraged in every possible way to accept the benefit accorded them for vocational training by the Federal Board for Vocational Education. To this end they should have while in the hospital such physical training and general education as will best promote their physical reconstruction and at the same time contribute most to their vocational training. Patients who do not elect or who are not eligible to continue their education under the federal board should receive such training as the medical and educational officers deem best in each individual case.

CORRECTIONS

In the "Honor Roll" published June 1, the following officers of the Medical Reserve Corps on duty in the Philippines, and giving Manila, P. I., as their home addresses, were not included: Capts. A. C. GARTON, B. L. BURDETTE, J. A. JOHNSTON, C. R. JOHNSON and P. M. LOWELL.

The order of Capt. GEORGE L. PEIRCE which appeared in THE JOURNAL announced that he had been ordered to duty from Maryland. This should have been Bower, W. Va.

In THE JOURNAL of August 17, under the heading "Orders to Officers of the Medical Reserve Corps," appears the name of Lieut B. B. SMITH of Philadelphia ordered from Fort Oglethorpe to Newport News for duty. The home address of Lieutenant Smith is Erie, Pa., instead of Philadelphia.

In THE JOURNAL of August 10, under the heading "Commissions Accepted, Medical Reserve Corps, U. S. Army," appears the name S. W. COFFMAN of Broadview, Ill. We are informed that Dr. Coffman's home is at Maywood, Ill.

COMMISSIONS ACCEPTED, MEDICAL RESERVE CORPS, U. S. ARMY

Previous lists published in THE JOURNAL, June 1, 22, and 29, July 13, 20 and 27, August 3, 10 and 17.

ALABAMA

Anniston—Brothers, T. J.
Birmingham—Dedman, J. E.
Kent, J. T.
Wadley—Denney, T. H.

ARKANSAS

DeQueen—Hopkinson, R. L.
Hamburg—Simpson, J. C.
Leslie—Hollabaugh, C. B.
Little Rock—Staples, D.
Round Pond—Powell, C. V.
Stuttgart—Swindler, E. B.

CALIFORNIA

Fresno—O'Hannesian, F.
Los Angeles—Frary, B. S.
Granger, A. S.
Holgate, C. E.
Lettice, F. E.
McCombs, V. J.
McKenna, W. J.
Mitchell, H. B.
Monrovia—Pottenger, J. E.
Parlier—McKenney, J. A.
Pomona—Smith, R. T.
Ripon—Gould, N. B.
San Francisco—Boskewitz, G. H.
Graham, L.
Tulare—Fuller, R. N.
Vallejo—Dempsey, R. D.

COLORADO

Boulder—Spencer, F. R.
Pueblo—Hoag, D. E.
Silverton—Condit, E. G.

CONNECTICUT

Bethel—Moore, H. F.
Bridgeport—Watts, J. F.
Hartford—Deming, C. D.
Lyme—Devitt, E. K.
New Haven—Falsey, E. T.
Waterford—Gosselin, G. A.

DELAWARE

Mullsboro—Dodd, H. H.
Selbyville—James, G. E.

DISTRICT OF COLUMBIA

Washington—Carr, W. B.
Guerra, A. L.
Warden, H. F. W.

FLORIDA

Jacksonville—Dobbs, C. H.
Heggie, N. M.
Miami—Brunner, E. C.
Tampa—Marney, C. R.
West Palm Beach—Cooley, R. O.

GEORGIA

Alamo—Yawn, B. W.
Americus—Grubbs, L. F.
Atlanta—Giuffrida, F. J.
Berlin—Edmondson, H. T.
Brunswick—Wilson, T. B.
Butler—Montgomery, R. C.
College Park—Henley, J. T.
Colquitt—Baughn, E. B.
Columbus—Blanchard, M.
Macon—Respess, H.
Ray City—Anderson, G. M.
Savannah—Barrow, C.
Bishop, E. L.
Bray, S. E.
Dancy, W. R.
Iseman, E.
Johnson, G. H.
Lee, L.
Sylvester—Tipton, W. C.
Thomasville—Ferguson, C. H.
Waycross—Folks, W. M.

IDAHO

Coeur D'Alene—Dwyer, J. C.

ILLINOIS

Blue Island—McCowan, D. C.
Breese—Warren, H. B.
Burlington—Roach, D. C.
Chicago—Casserly, E. A.
Challenger, C. J.
Gammage, A. E.
Graf, J. P.
Hagerty, T. W.
Herrman, C. B.
Jackson, H.
Manning, L.
Mosher, G. W.
Naughton, M. T.
Olkon, D. M.
Plice, W. A.
Roche, N. J.
Sharp, C. E.
Chicago—Trudel, J. L.
Wolf, S.
Wolman, N.
Wood, F. M.
Crete—Blim, S. P.
East Moline—Love, H. J.
Ochs, L. M.
Griggsville—Lovelass, H. C.
Jacksonville—Norris, F. A.
Lanark—Wales, A. H.
Lostant—Schonneschoeffer, W.
Minier—McLaughlin, S. M.
Moline—Beck, H. E.
Ohio—O'Malley, J. M.
Oregon—Cottlow, B. A.
Peoria—Hinckle, W. A.
Miller, S. M.
Simpson, O. W.
Rockford—Ackemann, H. W.
Rushville—Munson, H. O.
Springfield—Morrison, H. T.
Tiskilwa—Hess, H. R.
Horner, C. F.

INDIANA

Bloomfield—Cook, T. R.
Bloomington—Whetsell, L. E.
Bluffton—Metts, F. A.
Cannelton—Schriefer, E. E.
Colfax—Botts, H. H.
Denver—Waymire, E. S.
Evansville—Frick, H. C.
Hobart—MacKey, D.
Kokomo—Bennett, E. N.
Linnsburg—Riley, F. H.
Morristown—Patten, V. C.
New Middletown—Smoots, S. A.
South Bend—Gordon, J. M.
St. Bernice—Green, S. I.

IOWA

Amana—Hermann, C. H.
Boneparte—Whitely, J. H.
Conrad—Gould, G.
Gilmore City—Herrick, R. C.
Glenwood—Lacey, T. B.
Grinnell—Buck, S. C.
Hartley—Hand, W. C.
Lake City—McVay, M. J.
Marengo—Manahan, C. A.
Sioux City—Magoun, C. E.
Waterloo—Hoffman, A. A.
Winfield—McConnaughey, J. T.
Yale—Thornburg, W. V.

KANSAS

Baxter Springs—Scates, H. R.
Emporia—Williams, J. O.
Independence—Demott, C. W.
Kansas City—Bantleon, V. H.
Meriden—Preston, R. O.
Topeka—Vansa[illegible]s, L.
Wellington—Downing, R. H.

KENTUCKY

Adairville—Morgan, E. C.
Covington—Adams, F. T.
Louisville—Fugate, I. T.
Jenkins, W. A.
Stephens, O. T.
Littrell—Webb, J. R.
Sandy Hook—Hunter, C. R. H.
Simmons—Lake, W.

LOUISIANA

Baton Rouge—Hyde, A. S. J.
Carson—Callihan, P. W.
Villa Rica—Malone, W. H.

MAINE

Freeport—Lewis, W. J.
Limestone—Damon, A. H.
Livermore Falls—Heald, H. M.
Madison—Vose, S. N.
Sangerville—Freeman, F. H.
Swans Island—Fuller, A. J.
Wayne—Chenery, F. L., Jr.

MARYLAND

Baltimore—Darby, W. A.
Dehoff, G. W.
Lentz, C. S.
Emmitsburg—Flanagan, J. L.
Midland—Holdsworth, J. C.
Poeomoke City—Parker, A. A.

MASSACHUSETTS

Boston—Codman, T. A.
Grant, W. H.
Hyde, H. V.
Wheeldon, T. F.
Brookline—Barnes, H. A.
Saeger, E. T.
Brookton—Lupien, H. J.
Cohasset—Hinchliffe, F.
East Weymouth—Libby, J. H.
Fall River—Dedrick, A. C.
Holyoke—Cox, S. C.
Lynch, H. E.
Malden—Gay, F. W.
North Abington—Wheatley, F. G.
West Stockbridge—Hull, E. F.
Winthrop—Grainger, E. J.
Worcester—Ljungberg, D. G.

MICHIGAN

Ann Arbor—Langford, T. S.
Detroit—Brooks, C. D.
King, J. E.
Pratt, J. P.
Dowagiac—Herkimer, G. R.
Grosse Pointe—Griswold, D. M.

MINNESOTA

Beardsley—Weir, J. D.
Le Roy—Warren, C. L.
Minneapolis—Cavanor, F. T.
Mt. Iron—Parsons, F. L.
St. Paul—Kunce, F. E.
Windom—Ravn, B.

MISSISSIPPI

Alligater—Nichols, J. L.
Jackson—Rembert, G. W. F.
Meridian—Denson, E. G.
Murphy—Ferrell, L. T.
Sunflower—Higdon, B. H.

MISSOURI

Clarksdale—Elliott, J. R.
Columbia—Meanwell, W. E.
Craig—Ottman, J. C.
Ebenezer—Potter, A. E.
Greenridge—Hite, H. A.
Kansas City—Lux, P.
Major, R. H.
Miller, L. B.
Malden—VanCleve, J. D.
Rockport—Chamberlin, O. M. C.
St. Joseph—Forgrave, L. P.
Spencer, F. H.
St. Louis—Ambrose, O. A.
Creveling, H. C.
Frochlich, E. J.
Gundlach, A.
Harris, I. J.
Harris, R. C.
Herchenroeder, L. C.
Jansen, R. W.
Mellies, G. A.
Mulach, A. A.
Rogers, C. H.
Sullivan, F. J.
Young, A. O.
Waverly—Johnston, E. L.
Windsor—Jennings, R. J.

MONTANA

Butte—Biddle, G.
Roundup—Lewis, G. A.

NEBRASKA

Kearney—Robinson, L. S. B.
Talmage—Thompson, H. H.
Wausa—Newmann, E. V.

NEVADA

Aurora—Riley, W. H.

NEW HAMPSHIRE

Amherst—Pettengill, F. G.

NEW JERSEY

Lakewood—Thompson, O. C.
Mindham—McMurtire, W. A.
Newark—Hurff, J. W.
Orange—Gore, M. E.
Trenton—Costill, H. B.

NEW MEXICO

Albuquerque—Jameson, C. H.
Santa Fe—Hedding, B. E.

NEW YORK

Broad Channel—Both, J. L.
Brooklyn—Perrotta, N.
Phillips, W. G., Jr.
Hoosick Falls—Wilson, G. T.
Hudson—Mambert, J. W.
New York—Bloom, D. M.
Dinnerstein, M.
Franklin, J. W.
Kingery, L. B.
Kirby, G. H.
Levy, E. C.
Maddox, A. S.
Markofsky, D. M.
Miller, S. W.
O'Malley, T. S.
Ryder, M.
Sautter, C. M.
Stauffer, F. L.
Weller, W.
Poughkeepsie—Newman, T. W.
Rochester—Gibson, W. J.
Staten Island—Skidmore, E. L.
Warsaw—Thomson, W. R.
Warwick—Vosburgh, T. J.

NORTH CAROLINA

Allen—Smith, W. P.
Carthage—Kelly, A. P.
Durham—King, M. N.
Ryland—Spencer, J. R.
Winston Salem—Davis, T. W.

NORTH DAKOTA

Bismarck—Dunlap, L. G.
Crystal—Scott, R. A.
Grand Forks—Dean, A.

OHIO

Cincinnati—Fogel, E. I.
Cleveland—Dinsmore, R. S.
Drach, A. E.
Follansbee, R. G.
Manley, R. M.
Sobal, S. A.
Columbus—Beam, E. C.
Dayton—Werner, E. R.
Hudson—Miller, G. A.
Lakewood—Saddler, J. L.
Marble Cliff—Miller, S. H.
Massillon—Zintsmaster, L. B.
Nelsonville—Dew, C. G.
North Baltimore—Cavett, C. S.
Oberlin—Colegrove, P. C.
Paulding—Fauster, J. U.
Scott Town—Mayberry, I. W.
Springfield—Jones, C. L.
St. Paris—Hamsher, J. F.
Sylvania—Halbert, V. B.
Tiffin—Gosling, J. A.
Toledo—Lehman, F. J. J.
Louy, C.
Wright, J. F.
Woodville—Trumbull, H. N.
Xenia—Finley, R. K.

OKLAHOMA

Coalgate—Sadler, F. E.
Enid—Swank, J. R.
Frederick—Mitchell, L. A.
Henryetta—Boswell, H. D.
Minco—Little, J. S.
Oklahoma City—Maxwell, J. H.
Wells, W. W.
Tulsa—Trainer, W. J.
Vion—Morris, C. H.

OREGON

Albany—Riggs, G. E.
Portland—Ellis, R. H.
Parker, H. C.

PENNSYLVANIA

Avondale—Magraw, G. T.
Bellfonte—Huff, S. M.
Burgettstown—McKee, G. L.
Cassville—Koshland, J. G.
Clearfield—Rowles, L. C.
Darlington—Watterson, R. W.
Doylestown—Fox, C. D.
East Brady—Kelsea, W. H.
Minersville—Monaghan, J. M.
Philadelphia—Beck, A. F.
Loewenburg, S. A.
Stalberg, I. Z.
Pittsburgh—Baker, T.
Mackrell, J. S.
Steinsville—Fetherolf, W. J.
Swissvale—Caldwell, C. S.
Trumbauersville—Grim, H. C.
Woodlawn—Bryson, W. S.

RHODE ISLAND

Providence—Baker, N. C.

SOUTH CAROLINA

Abbeville—Hill, J. C.
Saluda—Boozer, H. T.

SOUTH DAKOTA

Lead—Clough, F. E.
Jackson, A. S.
Markel, I. J.
Northville—Bates, W. A.
Sioux Falls—Culver, C. F.
Donahoe, S. A.

TENNESSEE

Arlington—Harvell, W. T.
Knoxville—Skaggs, H. R.
Lynnville—Denham, R. H.
Memphis—Andrews, J. L.
Baird, W. O.
Walker, O. P.
Nashville—DeWitt, P.
Parrish, H. B.
Simpson, J. W.
Spain, W. C.

TEXAS

Benton—Hodde, F. H.
Childress—Jernigan, J. H.
College Station—Ehlinger, O.
Ft. Bliss—Bowman, M. H.
Galveston—Gammon, W.
Gatesville—Graves, E.
Houston—Alexander, J. C.
Grimes, G. D.
Marlin—Sewall, F. B.

McGregor—Blailock, H. F.
Mineral Wells—McConnell, L. H.
Munday—Hammond, J. E.
Petrolia—Russell, I. D.
Quannah—Frizzell, T. D.
San Antonio—Pagenstecher, G. A.
Sherman—McElhannon, A. M.
Temple—Lehman, C. F., Jr.
Parker, W. L.
Throckmorton—King, J. E.

UTAH

Bingham Canyon—Bruckheimer, R. M.
Hageman, P. S.
Smith, U. H.
Salt Lake City—Kirtley, H. P.

VERMONT

Hardwick—Crane, E. M.
Warren—Warren, A. B.

VIRGINIA

Richmond—Blanton, H. W.

WASHINGTON

Lamont—Preucel, J. E.
Seattle—Lazelle, H. G.
Spokane—Burger, T. D.
Rosenthal, S. E.
Wellpinit—Wise, A. H.
Yakima—Loudon, J. P.

WEST VIRGINIA

New Martinsville—Schmied, J. D.

WISCONSIN

Bayley—Morrissey, F. B.
Hayward—Pake, S. G.
Kaukauna—Flanagan, G. J.
La Crosse—Flynn, R. E.
Marshfield—Potter, R. P.
Vedder, J. B.
Milwaukee—Burback, T. H.
Viola—Parke, G.

WYOMING

Basin—Harris, C. E.
Riverton—Tonkin, A. B.

ORDERS TO OFFICERS OF THE MEDICAL CORPS, U. S. ARMY

Alabama

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, Capt. F. H. McCONNICO, Montgomery.

To Camp Travis, Fort Sam Houston, Texas, as sanitary inspector, from Fort Oglethorpe, Capt. I. W. PATTON, Madison. Base hospital, Lieut. D. H. SPARKS, Birmingham.

To Fort Oglethorpe for instruction, Lieut. JOSEPH R. CHISOLM, Marion Junction.

To New York City, Bellevue Hospital, for instruction, and on completion *to his proper station,* from Camp Wadsworth, Capt. W. L. THORNTON, Birmingham.

Resignation of Lieut. R. K. BUFORD, Huntsville, accepted.

Alaska

To Camp Lewis, American Lake, Wash., base hospital, Lieut. W. J. PIGG, Petersburg.

Arizona

To Camp Fremont, Palo Alto, Calif., base hospital, from Fort Rosecrans, Lieut. W. O. SWEEK, Phoenix.

To Camp Logan, Houston, Texas, as sanitary inspector, from Southern Department, Major H. T. SOUTHWORTH, Prescott.

To Camp Travis, Fort Sam Houston, Texas, base hospital, Capt. V. A. SMELKER, Nogales.

To Mineola, L. I., N. Y., Hazelhurst Field, for instruction, from Lake Charles, Capt. E. W. ADAMSON, Douglas.

Arkansas

To Austin, Texas, State University, for duty, from Camp Kelly, Lieut. B. GWALTNEY, Haskell.

To Camp Beauregard, Alexandria, La., base hospital, Capt. F. R. DORENTO, Fort Smith.

To Camp MacArthur, Waco, Texas, base hospital, Capt. O. J. T. JOHNSTON, Batesville.

To Fort Ontario, N. Y., base hospital, from Fort McPherson, Lieut. F. S. WATSON, Amity.

To Fort Riley for instruction, Lieuts. J. F. HALBROOK, Conway; T. J. POOL, Danville; C. E. KITCHENS, De Queen; W. M. MAJORS, Walcott.

To Hampton, Va., Langley Field, for duty, Lieut. W. H. DeCLARK, McGehee.

To New Haven, Conn., Yale Army Laboratory School, for duty, from Camp Greene, Lieut. L. H. CORNWALL; from Camp Pike, Lieut. C. M. HYLAND.

To Washington, D. C., for instruction, from Fort Oglethorpe, Lieut. E. B. BUCHANNAN, Texarkana.

California

To Ann Arbor, Mich., State Psychopathic Hospital, for intensive training, from Camp Sevier, Lieut. J. DE ANGILO, Stanford University.

To Camp Bowie, Fort Worth, Texas, base hospital, Capt. J. L. LOHSE, Oakland. For duty, from Camp Kearney, Lieut. E. W. SEAFORTH, San Francisco; from Fort Oglethorpe, Lieut. C. WILSON, Los Angeles.

To Camp Cody, Deming, N. M., base hospital, from San Francisco, Capt. T. O. BURGER, San Diego for duty, Lieut. S. N. ATKINS, Venice.

To Camp Grant, Rockford, Ill., as assistant to camp surgeon, from Camp Fremont, Major S. R. MORRIS.

To Camp Fremont, Palo Alto, Calif., base hospital, Capts. H. W. MURRAY, Pasadena; F. C. GALEHOUSE, Taft; Lieuts. H. G. WATTERS, Watsonville; N. H. SALTER, Williams. For temporary duty, from Camp Lewis, Lieut. O. M. HARRAH, La Manda Park.

To Camp Kearney, Linda Vista, Calif., for duty, from Fort Riley, Lieut. C. D. FANTON, Riverside.

To Camp Lewis, American Lake, Wash., base hospital, from Camp Kearney, Capt. H. K. BERKLEY, Santa Monica; from San Francisco, Capt. T. J. ORBISON, Los Angeles.

To Fort Oglethorpe for instruction, Capt. J. C. COPELAND, Los Angeles, Lieut. M. D. BAKER, San Jose.

To Fort Ontario, N. Y., base hospital, from Camp Cody, Capt. L. L. RIGGIN, Pasadena.

To Fort Riley for instruction, Capts. A. G. HAYGOOD, Downey; E. A. JONES, Los Angeles; J. E. CLARK, Oakland; R. T. SMITH, Pomona; Lieut. E. V. FALK, Modesto.

To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieut. C. C. ROSS, San Francisco.

To Fort Sill, Okla., base hospital, from Camp Pike, Major H. C. LOOS, San Diego.

To Hoboken, N. J., base hospital, from Camp MacArthur, Capt. E. DOZIER, Redding.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. M. B. WOLFF, San Francisco.

To Canal Zone, for duty, from Fort McDowell, Major R. L. I. SMITH, Pasadena.

To report by wire to the commanding general, Western Department, for assignment to duty, Capts. R. R. ROOT, Corona. H. M. DALE, B. S. FRARY, Lieut. A. E. SMITH, Los Angeles.

To San Francisco, Letterman General Hospital, for temporary duty, Capt. A. F. HIGGINS, Sacramento.

To the inactive list, from Western Department, Lieut. F. C. E. MATTISON, Pasadena.

The following order has been revoked: *To Camp Bowie,* Fort Worth, Texas, from Camp Kearney, Capt. R. HAGAN, Los Angeles.

Canal Zone

To Camp Beauregard, Alexandria, La., base hospital, from Camp Pike, Major W. M. JAMES, Ancon.

To Camp Dix, Wrightstown, N. J., for duty, from Newport News, Major S. J. TAYLOR, Cristobal.

Colorado

To Camp Cody, Deming, N. M., base hospital, Capt. H. B. KILLOUGH, Pueblo. For duty, Lieut. W. H. ACKER, Delta.

To Camp Lee, Petersburg, Va., as camp surgeon, from Fort Slocum, Col. C. Y. BROWNLEE.

To Camp Lewis, American Lake, Wash., base hospital, Capt. W. F. BROWNELL, Fort Collins; Lieut. I. J. CLARK, Denver.

To Camp Zachary Taylor, Louisville, Ky., base hospital, Lieut. J. A. PHILPOTT, Denver.

To Fort Riley for instruction, Lieut. E. G. CONDIT, Silverton.

To New Haven, Conn., for duty, Capt. S. SIMON, Denver.

Connecticut

To Azalea, N. C., for duty, from New Haven, Capt. J. B. GRIGGS, Hartford.

To Camp Devens, Ayer, Mass., for duty, Lieut. G. A. GOSSELIN, Waterbury.

To Camp Hancock, Augusta, Ga., base hospital, Capt. C. O. PURINTON, West Hartford.

To Camp Lewis, American Lake, Wash., base hospital, from Fort Oglethorpe, Lieut. J. I. WOISARD, Bristol.

To Fort Oglethorpe for instruction, Lieut. L. H. FROST, Plainville, from duty as private, Lieut. A. B. GROSS, Hartford.

To Fort Ontario, N. Y., base hospital, from Camp Upton, Lieut. E. J. WHALEN, Hartford.

To Hoboken, N. J., base hospital, from Camp Upton, Lieut. L. HOLMES, Manchester. For duty, from Army Medical School, Capt. A. K. OSHANSKY, New Haven.

To New York, Bellevue Hospital, for instruction, and on completion *to his proper station,* from Camp Meade, Lieut. J. F. SAGARINO, Hartford. Neurological Institute, for instruction, Lieut. C. D. DEMING, Hartford.

To Plattsburg Barracks, N. Y., for duty, from Camp Dix, Capt. S. L. GOODRICH, Waterbury.

To Tobyhanna, Pa., for duty, Lieut. E. K. DEVITT, Lyme.

To Walter Reed General Hospital, Takoma Park, D. C., for temporary duty, Lieut. J. F. WATTS, Bridgeport.

Delaware

To Camp Abraham Eustis, Lee Hall, Va., for duty, Lieut. G. E. JAMES, Selbyville.

To Fort Sill, Okla., base hospital, from Camp MacArthur, Lieut. J. H. MULLIN, Wilmington.

To Hoboken, N. J., for duty, from Cape May, Capt. E. H. LENDERMAN, Wilmington.

District of Columbia

To Camp Devens, Ayer, Mass., as assistant to camp surgeon, from Southern Department, Major A. B. JONES.

To Camp Jackson, Columbia, S. C., base hospital, and on completion *to Camp Hancock,* Augusta, Ga., base hospital, Major F. LEECH, Washington.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Oglethorpe, Capt. S. MOSKOWITZ, Washington.

To Camp Zachary Taylor, Louisville, Ky., base hospital, from Washington, Capt. S. C. JOHNSON, Washington.

To Fort Oglethorpe for instruction, from Walter Reed General Hospital, Lieut. W. J. C. THOMAS, Washington.

To Newport News, Va., for duty, from Camp Gordon, Capt. G. S. SAFFOLD, Washington.

To Washington, D. C., for conference and on completion *to Fort McPherson, Ga.,* for duty, from Biltmore, Major J. F. MITCHELL, Washington.

Florida

To Camp Greene, Charlotte, N. C., for duty, Lieut. C. H. DOBBS, Jacksonville.

To Camp Shelby, Hattiesburg, Miss., base hospital, Capt. G. R. HOLDEN, Jacksonville.

To Camp Wadsworth, Spartanburg, S. C., base hospital, from Camp Beauregard, Capt. E. G. BIRGE, Jacksonville.

To Fort Oglethorpe for instruction, Lieut. M. C. KAYTON, Wauchula.

To Plattsburgh Barracks, N. Y., for duty, from Fort Oglethorpe, Capt. E. K. JAUDON, Miami.

To Waynesville, N. C., for duty, from New Haven, Capt. F. J. BOWEN, Jacksonville.

Honorably discharged on account of physical disability existing prior to entrance into the service, Lieut. L. W. GLATZAU, Delard.

Georgia

To Camp A. A. Humphreys, Accotink, Va., for temporary duty, Lieut. G. K. TOUCHTON, Douglas.

To Camp Crane, Allentown, Pa., for temporary duty, from Camp Dix, Lieut. C. M. MASHBURN, Atlanta; H. M. BARKER, Flintstone.

To Camp Greene, Charlotte, N. C., for duty, Capts. L. LEE, Savannah; A. J. MOONEY, Statesboro; Lieuts. M. BLANCHARD, Columbus; C. MOORE, Lindale.

To Camp Hancock, Augusta, Ga., base hospital, Lieut. A. S. M. COLEMAN, Douglas.

To Camp Jackson, Columbia, S. C., base hospital, from Camp Meade, Lieut. J. F. BURKHALTER, Morven.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, Capts. R. P. GRIFFITH, Columbus; D. E. MORGAN, La Grange; Lieuts. C. L. ELLIS, Kingston; O. DANIEL, Macon; J. L. LEE, Pinehurst; J. L. TYRE, Screven; W. R. THOMAS, Waycross.

To Camp MacArthur, Waco, Texas, for temporary duty, Lieut. S. E. BRAY, Savannah.

To Camp McClellan, Anniston, Ala., as camp surgeon, from Camp Wheeler, Lieut.-Col. L. C. DUNCAN.

To Camp Meade, Admiral, Md., for duty, Lieuts. P. CHEEK, Clemont; J. L. CHANDLER, Rome.

To Camp Sherman, Chillicothe, O., as camp surgeon, from Fort Oglethorpe, Major H. B. McINTYRE.

To Camp Wadsworth, Spartanburg, S. C., for duty, Capts. N. J. COKER, Canton; E. L. BAKER, Columbus; E. C. CRUMMEY, Jesup.

To Camp Wheeler, Macon, Ga., base hospital, Capt. W. B. SUMMERALL, Atlanta.

To Fort Oglethorpe for instruction, Capt. H. W. HARRIS, Ashburn; Lieuts. B. W. YAWN, Alamo; H. S. GEHRKEN, Augusta; R. E. BOWMAN, Brownwood; G. H. ELARBEE, Daisy; A. C. DORMINY, Hoboken.

To Fort Sam Houston, Texas, base hospital, Lieut. S. P. WISE, Plains.

To Fort Slocum, N. Y., for duty, from Fort Oglethorpe, Lieut.-Col. E. M. TALBOTT.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieuts. T. H. CLARK, Douglas; O. Y. MALONE, Fayetteville.

To New York City, Neurological Institute, for instruction, Lieut. L. W. WILLIAMS, Savannah.

To Walter Reed General Hospital, Takoma Park, D. C., for temporary duty, Lieut. C. REED, Hilton.

The following order has been revoked: *To Camp Wadsworth,* Spartanburg, S. C., for duty, from Southeastern Department, Lieut. C. J. HIND, Atlanta.

Idaho

To Camp Custer, Battle Creek, Mich., base hospital, Capt. J. A. DODD, Moscow.

To Camp Dodge, Des Moines, Iowa, for temporary duty, Lieut. W. P. SCROGGS, Eden.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Riley, Lieut. V. G. LOGAN, Rockland.

Illinois

To Azalea, N. C., for duty, from New Haven, Lieuts. O. COHEN, Joliet; J. M. MORAN, Oak Forest; from Walter Reed General Hospital, Major W. A. N. DORLAND, Chicago.

To Camp Beauregard, Alexandria, La., as assistant to division surgeon, from Camp Sheridan, Capt. J. E. WALTON, Medora.

To Camp Crane, Allentown, Pa., for temporary duty, from Des Moines, Lieut. J. O. BAILIFF, Chicago; from Fort Riley, Capt. V. M. JARED, Chicago.

To Camp Custer, Battle Creek, Mich., for duty, Lieuts. B. O. SWINEHART, Cooksville; E. D. SMITH, Springfield.

To Camp Dodge, Des Moines, Iowa, as assistant to division surgeon, from Fort Sill, Major J. G. MAXON, Harvard. As orthopedic surgeon, from Chicago, Lieut. W. C. BLIM, Crete. Base Hospital, Capt. J. A. GREEN, Rockford. For temporary duty, Lieut. L. V. MALONE, Chicago.

To Camp Gordon, Atlanta, Ga., base hospital, Capt. J. M. WASHBURN, Chicago.

To Camp Grant, Rockford, Ill., base hospital, Capt. F. J. EBERSPACHER, Pana; Lieut. P. S. SCHOLES, Canton.

To Camp Greene, Charlotte, N. C., for duty, Lieut, H. C. LOVELASS, Griggsville.

To Camp Hancock, Augusta, Ga., base hospital, Capt. L. J. HUGHES, Elgin; Lieut. J. F. DAVIS, Chicago; from Camp Jackson, Lieut. N. C. STAM, Chicago.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Camp Greene, Lieut. L. H. HARNER, Chicago.

To Camp Lewis, American Lake, Wash., base hospital, from Fort Oglethorpe, Lieut. W. F. BUCKNER, Watseka.

To Camp Logan, Houston, Texas, base hospital, Capt. F. G. DYAS, Chicago.

To Camp McClelland, Anniston, Ala., base hospital, Capt. A. H. RUBOWITZ, Chicago; Lieut. J. W. OVITZ, Genoa.

To Camp Meade, Admiral, Md., for duty, Capts. H. J. LOVE, East Moline; H. E. BECK, Moline; Lieuts. C. C. MOE, Berwyn; F. DENSON, Bloomington; R. J. ROCHE, Chicago; W. L. CROUGH, Fairview; O. P. HAMILTON, Forrest.

To Camp Pike, Little Rock, Ark., base hospital, Capt. C. W. COMPTON, Springfield.

To Camp Shelby, Hattiesburg, Miss., base hospital, from Camp Jackson, Lieut. W. J. BUTLER, Chicago.

To Camp Sheridan, Montgomery, Ala., base hospital, Capt. B. J. LACHNER, Rock Island.

To Camp Sherman, Chillicothe, Ohio, base hospital, Capt. B. R. Beers, Chicago.

To Camp Travis, Fort Sam Houston, Texas, base hospital, from Corpus Christi, Lieut. T. G. ALLEN, Chicago.

To Camp Wadsworth, Spartanburg, S. C., base hospital, from Fort Sheridan, Capt. J. W. VANDERSLICE, Oak Park. For duty, Capt. J. W. ELLIS, Chicago; from Camp Meade, Capt. E. M. RUNDQUIST, Rockford.

To Camp Wheeler, Macon, Ga., base hospital, Lieut. J. H. EDGECOMB, Ottawa; from Camp A. A. Humphreys, Capt. J. K. POLLOCK, Elgin.

To Camp Zachary Taylor, Louisville, Ky., base hospital, Lieut. T. W. HAGERTY, Chicago.

To Charleston, S. C., for duty, Capt. S. A. SPRINGWATER, Chicago; Lieut. W. R. BLACKBURN, Virginia.

To Chicago for duty, Capt. F. A. JEFFERSON, Chicago.

To Corpus Christi, Texas, for duty, from Camp Jackson, Major B. M. LINNELL, Chicago.

To Fort McHenry, Md., for temporary duty, from Camp Jackson, Lieut. M. DOKTORSKY, Chicago.

To Fort McPherson, Ga., for duty, from Camp Wadsworth, Lieut. H. W. CARLIN, Chicago.

To Fort Monroe, Va., for temporary duty, Capt. P. L. TAYLOR, Springfield.

To Fort Moultrie, S. C., for duty, Capt. M. T. HAUGHTON, Chicago.

To Fort Oglethorpe for instruction, Capts. J. E. STANTON, Chicago; F. J. MAHA, Dundee; C. J. PRICE, Mount Morris; H. E. PINTLER, Peoria; Lieuts. H. R. STRUTHERS, Ashkum; SOL. S. GOLDEN, H. HOFMANN, L. J. JACOBSON, G. E. PFEIFFER, O. W. REST, Chicago; J. N. BUCHANAN, Freeport; N. B. WILLCOOKSON, Illiopolis; F. V. CHMELIK, Joliet; S. M. McLAUGHLIN, Minier; from Camp Dodge, Major C. D. WILKINS, Chicago.

To Fort Ontario, N. Y., base hospital, from Camp Upton, Lieut. F. W. FIEDLER, Butchtown; from Fort McPherson, Capt. A. D. WEST, Moline.

To Fort Riley for instruction, Lieuts. H. D. EATON, Harvard; R. C. VERNOR, Nashville; J. R. BIERLY, G. J. MAUTZ, Springfield; C. D. HASKELL, Williamsville.

To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieut. F. D. WALK, Chicago.

To Fort Screven, Ga., for duty, Capt. W. SCHOENNESHOEFER, Lostant.

To Fort Sill, Okla., base hospital, from Camp Bowie, Lieut. T. B. KELLY, Du Quoin. For temporary duty, from Camp Dodge, Major E. C. G. FRANING, Galesburg.

To Governors Island, N. Y., for duty, Lieut. B. A. COTTLOW, Oregon.

To Mineola, L. I., N. Y., for instruction, Capt. G. W. MOSHER, Chicago.

To New Haven, Conn., for duty, Capt. H. C. MILLER, Chicago; Lieut. E. LEVY, Winfield. *To Yale Army Laboratory School,* for instruction, Lieut. E. A. CASSERLY, Chicago.

To New York, Bellevue Hospital, for instruction, and on completion *to Camp Devens,* Ayer, Mass., base hospital, Lieut. P. H. FURNO, Chicago. On completion *to Camp Dix,* Wrightstown, N. J., base hospital, Lieut. J. T. MEYER, Chicago. On completion *to Camp Meade,* Admiral, Md., base hospital, Capt. C. E. POWELL, Polo. *To Neurological Institute* for instruction, Lieut. F. M. SYLVESTER, Oak Park.

To report by wire to the commanding general, Eastern Department, for assignment to duty, from Lakewood, Capt. T. J. O'MALLEY, Chicago.

To Washington, D. C., for duty in the Surgeon-General's Office, Lieut. D. C. SUTTON, Chicago.

To Wichita Falls, Texas, for duty, from Fort Worth, Capt. R. H. KUHNS, Chicago.

To Williamsbridge, N. Y., for observation and treatment, from Camp Greene, Capt. T. S. CROWE, Chicago.

The following orders have been revoked: *To Camp Bowie,* Fort Worth, Texas, for duty, from Western Department, Lieut. G. A. TANKERSLEY, Owaneco. *To Fort Oglethorpe* for instruction, from Camp Gordon, Lieut. P. E. GREENLEAF, Bloomington.

Indiana

To Ann Arbor, Mich., Psycopathic Hospital, for intensive training, Lieut. E. K. HOLT, Indianapolis.

To Camp A. A. Humphreys, Accotink, Va., base hospital, Lieut. E. P. KING, Gary.

To Camp Crane, Allentown, Pa., for temporary duty, from Camp Custer, Capt. H. H. THOMPSON, Noblesville, from Camp Wadsworth, Major H. M. HOSMER, Gary.

To Camp Dodge, Des Moines, Iowa, base hospital, Lieut. E. N. BENNETT, Kokomo.

To Camp Greene, Charlotte, N. C., for duty, Capt. T. R. COOK, Bloomfield; Lieut. D. MACKEY, Hobart; from duty as a private, Lieut. J. M. TITUS, Hebron.

To Camp Meade, Admiral, Md., for duty, Lieut. W. D. INLOW, Manila. *To examine the command* for nervous and mental diseases, Lieut. B. D. PAUL, Brookston.

To Camp Sevier, Greenville, S. C., base hospital, Capt. O. E. FINK, Terre Haute.

To Camp Shelby, Hattiesburg, Miss., base hospital, Lieut. M. S. HARMON, LaPorte.

To Camp Sherman, Chillicothe, Ohio, base hospital, Lieut. E. B. RUSCHLI, Lafayette.

To Camp Wadsworth, Spartanburg, S. C., base hospital, from Fort Slocum, Major H. M. HOSMER, Gary.

To Camp Zachary Taylor, Louisville, Ky., base hospital, Lieuts. J. W. CARMACK, F. C. DENNY, Indianapolis.

To Charleston, S. C., for duty, Capt. E. R. SISSON, Greenfield.

To Fort Monroe, Va., for duty, from Camp Upton, Capt. G. W. ANGLIN, Warsaw; from Fort McPherson, Lieut. W. F. JOHNSON, Indianapolis.

To Fort Oglethorpe for instruction, Lieuts. A. C. PEBWORTH, Indianapolis, W. F. GOSSLER, Marion; E. E. PARKER, Oxford; O. A. BYERS, Petersburg; W. McQUEEN, Quincy.

To Fort Ontario, N. Y., base hospital, from Camp Sheridan, Lieut. F. L. REESE, Bicknell.

To Fort Riley for instruction, Capts. L. ROGERS, French Lick; C. A. DRESCH, Mishawaka; Lieuts. V. G. BLACK, Fishers; E. O. NEWLIN, Fontanet; O. D. LUDWIG, F. L. TRUITT, Indianapolis; R. E. DAVIS, Madison; G. L. GIBBONS, Mitchell; H. H. ISAACS, Tangier.

To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieut. C. S. BLACK, Warren.

To Fort Sill, Okla., for duty, Capt. A. FUNK, New Albany.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. F. A. KIMBLE, Anderson.

To report to the commanding general, Central Department, for assignment to duty, Capt. J. L. McBRIDE, Zanesville.

To Walter Reed General Hospital, Takoma Park, D. C., for temporary duty, Lieut. H. ALDRICH, Fairmont.

The following order has been revoked: *To Fort Oglethorpe* for instruction, Capt. S. C. NORRIS, Anderson.

Iowa

To Camp Bowie, Fort Worth, Texas, base hospital, Lieut. W. C. HAND, Hartley.

To Camp Custer, Battle Creek, Mich., base hospital, Capt. M. B. GALLOWAY, Webster City; Lieut. A. L. DARCKE, Des Moines. For duty, Lieut. D. B. SOLLIS, Bedford.

To Camp Dodge, Des Moines, Iowa, base hospital, Capt. M. A. HEALY, Boone, Lieuts. J. G. CLAPSADDLE, Burt; M. C. BRUSH, Shenandoah.

To Camp Grant, Rockford, Ill., base hospital, Capt. A. D. McKINLEY, Des Moines.

To Camp Jackson, Columbia, S. C., base hospital, Capt. G. F. HARKNESS, Davenport; from Tuscaloosa, Lieut. G. H. STEELE, Belmond.

To Camp Meade, Admiral, Md., for duty, Lieut. W. J. LEAMAN, Leaman Place.

To Fort Oglethorpe for instruction, Lieut. W. J. FENTON, Mystic; W. J. FOSTER, Wellman.

To Fort Riley for instruction, Capt. T. LUCAST, Forest City; Lieuts. C. L. BASKIN, Chariton; D. O. KING, Eldora; W. E. LYON, Garden Grove; R. HOUSTON, Nevada; C. H. BARTRUFF, Reinbeck; JUDSON W. MYERS, Sheldon; A. A. HOFFMANN, Waterloo.

To Fort Sam Houston, Texas, for duty, from Fort Riley, Capt. R. HUIZENGA, Rock Valley, Lieut. R. C. HERRICK, Gilmore City.

To Fort Sill, Okla., base hospital, from Camp Bowie, Capt. W. H. FOX, Waucoma.

To New Haven, Conn., for duty, Capt. S. C. BUCK, Grinnell.

To Yale Army Laboratory School for instruction, Lieut. W. H. HOMBACH, Remsen.

To report by wire to the commanding general, Central Department, for assignment to duty, Capt. E. T. JAYNES, Waterloo.

Kansas

To Camp Beauregard, Alexandria, La., base hospital, Lieut. A. J. O'LEARY, Burr Oak.

To Camp Bowie, Fort Worth, Texas, base hospital, Lieut. E. M. IRELAND, Coldwater.

To Camp Custer, Battle Creek, Mich., base hospital, Capt. A. J. LIND, Kansas City.

To Camp McClelland, Anniston, Ala., for duty, Lieut. R. H. DOWNING, Wellington.

To Camp Pike, Little Rock, Ark., base hospital, Capt. L. S. COPLAN, Wellington; from Rock Island, Capt. R. C. HENDERSON, Erie.

To Fort Riley for instruction, Capts. C. W. DE MOTT, Independence; E. B. HAYNES, Madison; Lieuts. A. W. LOVENE, Burdick; R. M. TINNEY, Norton; B. D. THOMAS, Shawnee. For temporary duty, Capt. J. A. SETTLE, Reading.

To Fort Sam Houston, Texas, base hospital, Lieut. R. S. C. FISHER, Wichita.

To New Haven, Conn., for duty, Lieut. C. F. ENSIGN, Lawrence.

Honorably discharged, Lieut. E. V. ADAMS, Topeka.

The following orders have been revoked: *To Camp Crane*, Allentown, Pa., base hospital, from Fort Riley, Capt. H. ATKINS, Pratt. *To Rochester, Minn.*, and on completion *to his proper station*, from Camp Zachary Taylor, Capt. G. M. GAFFORD, Kinsley.

Kentucky

To Camp Abraham Eustis, Lee Hall, Va., for temporary duty, Major B. F. VAN METER, Lexington.

To Camp Meade, Admiral, Md., for duty, Capt. M. N. BOWMAN, Lexington.

To Fort McHenry, Md., for temporary duty, from Camp Jackson, Capt. L. S. Robinson, Madisonville.

To Fort Oglethorpe for instruction, Lieuts. E. J. NESTLEY, Covington; A. D. ECHERT, Newport; C. R. HUNTER, Sandy Hook.

To Fort Porter, N. Y., for duty, from Fort Ontario, Capt. M. H. YEAMAN, Henderson.

To Hampton, Va., Langley Field, for duty, Capt. S. D. WETHERBY, Middletown.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion to Camp Sheridan, Montgomery, Ala., base hospital, Lieut. W. I. HUME, Louisville.

Louisiana

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. J. B. STAMPER, Caspiana.

To Camp Lee, Petersburg, Va., base hospital, Lieut. T. LATIOLAIS, Breaux Bridge.

To Camp Wheeler, Macon, Ga., for duty, Lieut. A. S. J. HYDE, Baton Rouge.

To Fort Oglethorpe for instruction, Lieut. G. J. DE REYNA, New Orleans; from Camp Beauregard, Lieut. W. T. McNEESE, Angie.

To Fort Sill, Okla., base hospital, from Camp Bowie, Capt. R. M. BLAKELY, New Orleans.

To Newport News, Va., as orthopedic surgeon, from Fort Oglethorpe, Lieut. R. C. VOSS, New Orleans.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to his proper station*, from Walter Reed General Hospital, Capt. J. G. MARTIN, Lake Charles.

Honorably discharged on account of physical disability existing prior to entrance into the service. Major R. M. VAN WART, New Orleans.

Maine

To Camp Devens, Ayer, Mass., base hospital, Lieut. J. E. POULIN, Augusta. For duty, Lieut. C. J. TAYLOR, Bangor.

To Fort Oglethorpe for instruction, Lieut. H. E. ANDERSON, Acton.

To New York, Bellevue Hospital, for instruction and on completion *to his proper station*, from Camp Jackson, Capt. H. M. CHAPMAN, Bangor.

Maryland

To Camp Jackson, Columbia, S. C., to examine the command for nervous and mental diseases, from Baltimore, Lieut. L. B. HOHMAN, Baltimore.

To Camp Meade, Admiral, Md., for duty, Lieuts. G. W. DE HOFF, Baltimore; G. A. LEWIS, Roundup. With the board examining the troops for cardiovascular diseases, from Camp Lee, Capt. A. D. ATKINSON, Baltimore.

To Fort Meyer, Va., for duty, Capt. J. C. HOLDSWORTH, Midland.

To Fort Oglethorpe for instruction, Lieuts. L. P. HOLMES, H. H. JOHNSON, P. G. WEISMAN, Baltimore.

To New York, Bellevue Hospital, for instruction, and on completion *to his proper station*, from Camp Jackson, Lieut. J. T. NELSON, Baltimore. From Camp Meade, Lieuts. C. L. LUCKETT, H. H. WARNER, Baltimore.

The following orders have been revoked: *To Fort Oglethorpe* for instruction, Lieut. M. H. TIBBETTS, Baltimore. *To Mineola, L. I., N. Y.*, for instruction, Lieut. F. LINTHICUM, Baltimore.

Massachusetts

To Azalea, N. C., for duty, from New Haven, Lieuts. C. W. CLARK, Newtonville; E. D. PILLSBURY, Somerville.

To Boston, Mass., Franklin Union Institute, to make physical examinations and give medical attention to drafted men, Capt. J. H. LAWRENCE, Brockton.

To Camp Beauregard, Alexandria, La., base hospital, Lieut. F. HINCHLIFFE, Cohasset.

To Camp Crane, Allentown, Pa., for temporary duty, Capt. F. R. SIMS, Melrose; from Camp Devens, Lieut. E. A. ROGERS, Boston; from Camp Gordon, Lieut. J. A. GOULD, Westboro; from Camp Jackson, Capt. A. H. PIERCE, Leominster; from Camp Sheridan, Lieut. J. A. KEENAN, Boston.

To Camp Devens, Ayer, Mass., base hospital, Lieuts. G. A. BUCKLEY, Brockton; F. L. LOVELAND, Newton; J. J. PAGLIA, Worcester. For duty, Lieut. E. P. HAND, Holyoke.

To Camp Dix, Wrightstown, N. J., as camp surgeon, from Camp Devens, Lieut.-Col. H. R. BEERY.

To Camp Gordon, Atlanta, Ga., with the board examining the command for nervous and mental diseases, Lieut. E. H. WISWALL, Wellesley.

To Camp Greene, Charlotte, N. C., for duty, Lieut. C. G. MILES, Brockton.

To Camp Meade, Admiral, Md., for duty, Capt. C. MALONE, Jamaica Plain; Lieuts. C. P. WARREN, Amesbury; T. S. DONOVAN, Lawrence.

To Camp Wadsworth, Spartanburg, S. C., for duty, Lieut. W. M. ST. GEORGE, Holyoke.

To Fort Oglethorpe for instruction, Lieuts. HAROLD C. TOOKER, Boston; S. B. ANNIS, Natick; S. F. WILDE, New Bedford; L. O. ASHTON, St. Lawrence; D. B. COLEMAN, Wellesley; from duty as private, Lieut. A. C. MORAN, Fall River.

To Fort Ontario, N. Y., base hospital, from Camp Devens, Lieut. E. A. MESERVE, Boston.

To Governors Island, N. Y., for duty, Capt. D. H. CHASE, Cambridge.

To Lakewood, N. J., for temporary duty, Lieuts. C. STURGIS, Boston; R. C. JONES, Fitchburg.

To New York, Bellevue Hospital, for instruction, and on completion *to his proper station*, from Camp Wadsworth, Lieut. J. J. DONOVAN, Boston; from Camp Zachary Taylor, Capt. W. E. DENNING, Worcester.

To Panama Canal Department for duty, from Camp Raritan, Major J. B. PASCOE, Revere.

To report by wire to the commanding general, Southeastern Department, for assignment to duty, from Camp Hancock, Lieut. P. C. DENNETT, Alston.

To Rockefeller Institute for instruction and on completion *to his proper station*, from Camp Meade, Capt. H. E. MAYNARD, Worcester. For instruction in the treatment of infected wounds, and on completion *to Camp Greene*, Charlotte, N. C., base hospital, Capt. F. A. WEBSTER, Boston.

Honorably discharged on account of physical disability existing prior to entrance into the service, Lieut. G. W. SHIRK, Hatfield.

The following order has been revoked: *To Camp Wadsworth*, Spartanburg, S. C., for duty, Capt. A. K. YOOSUF, Worcester.

Michigan

To Azalea, N. C., for duty, from New Haven, Capt. J. A. ELLIOTT, Battle Creek.

To Camp Crane, Allentown, Pa., base hospital, from Camp Sevier, Lieut. H. A. BECK, Detroit.

To Camp Custer, Battle Creek, Mich., base hospital, Capt. R. C. BUCK, St. Johns; Lieut. H. HENDERSON, Detroit. For duty, Capts. C. D. BROOKS, Detroit; C. H. MURPHY, Lansing; Lieut. C. CAREY, Detroit. *To examine the command* for nervous and mental diseases, Lieut. R. A. MORTER, Kalamazoo.

To Camp Dodge, Des Moines, Iowa, for temporary duty, from Camp Beauregard, Lieut. L. B. KINGERY, Ann Arbor.

To Camp Meade, Admiral, Md., base hospital, Lieut. J. K. BURNS, Jr., Detroit. For duty, Capt. T. H. E. BELL, Reading; Lieut. W. O. MERRILL, Detroit. With the board examining the troops for tuberculosis, Lieut. R. H. JUERS, Highland Park.

To Fort Oglethorpe, base hospital, from Camp A. A. Humphreys, Major F. H. NEWBERRY, Detroit. For instruction, Capts. H. J. BURRELL, Benton Harbor; D. P. MAYHEW, Detroit; O. G. JOHNSON, Fostoria; Lieuts. C. F. DuBOIS, Detroit; E. A. SCHILZ, Grand Lodge; A. S. EGAN, Muskegon; L. E. GIBSON, Oxford.

To Fort Ontario, N. Y., for temporary duty, Lieut. H. A. REYE, Detroit.

To Fort Riley for instruction, Lieut. JOHN G. RULISON, Lansing.

To Governors Island, N. Y., for duty, Capt. G. H. HERKIMER, Dowagiac.

To Lakewood, N. J., for temporary duty, from Camp Jackson, Lieut. E. M. CHAUNCEY, Albion.

To New York, Bellevue Hospital, for instruction and on completion *to Camp Dix*, Wrightstown, N. J., base hospital, Lieut. F. L. HONHART, Detroit. On completion *to Camp Meade*, Admiral, Md., base hospital, Capt. R. K. YOUNG, Detroit. On completion *to his proper station*, from Camp Wadsworth, Lieut. S. C. BLACK, Rochester.

To report to the commanding general Central Department, for assignment to duty, Capt. H. S. GARNER, Detroit. *To report to the commanding general*, Southeastern Department, for assignment to duty, from Camp Hancock, Lieut. J. RHINES, Laurium.

To Walter Reed General Hospital, Takoma Park, D. C., for duty, from Fort Oglethorpe, Capt. A. E. OWEN, Lansing.

To Washington, D. C., for duty, from Camp Custer, Capt. O. H. CLARK, Kalamazoo.

Minnesota

To Belleville, Ill., Scott Field, for duty, Capt. G. T. AYRES, Ely.

To Camp Custer, Battle Creek, Mich., base hospital, Capts. M. W. SMITH, Red Wing; W. E. RICHARDSON, Slayton; Lieut. L. W. ANDERSON, Atwater.

To Camp Dodge, Des Moines, Ia., base hospital, Lieut. T. GRATZEK St. Paul.

To Camp Gordon, Atlanta, Ga., base hospital, Lieut. W. J. KREMER, Minneapolis.

To Camp Grant, Rockford, Ill., base hospital, Capts. S. C. SCHMITT, Minneapolis; M. M. GHENT, St. Paul; Lieut. J. A. DAHL, Minneapolis.

To Camp Greene, Charlotte, N. C., for duty, Lieuts. A. E. AMUDSEN, Oslo; R. B. J. SCHOCH, St. Paul.
To Camp Sevier, Greenville, S. C., base hospital, Capt. H. L. ULRICH, Minneapolis.
To Camp Shelby, Hattiesburg, Miss., for duty, Capt. A. E. BENJAMIN, Minneapolis; Lieut. P. E. STANGL, St. Cloud.
To Fort Oglethorpe, for instruction, Lieut. E. O. SWANSON, Brainard.
To Fort Riley, base hospital, Capt. A. J. RUDOLF, Waseca. For instruction, Lieuts. L. J. HOLMBERG, Canby; A. M. CRANDALL, Fairfax; F. T. CAVANOR, Minneapolis.
To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieut. W. J. KUCERS, Hutchinson.
To Hot Springs, Ark., for observation and treatment, Lieut. F. P. FRISCH, Kimball. For temporary duty, from Camp Colt, Lieut. R. N. JONES, Minneapolis.
To Mineola, L. I., N. Y., Hazelhurst Field, for duty, from Surgeon-General's Office, Capt. A. S. HAMILTON, Minneapolis.
To New Haven, Conn., for temporary duty, from Camp Custer, Capt. C. R. CHRISTENSON, Starbuck.
To New York, Bellevue Hospital, for instruction, and on completion *to his proper station*, from Camp Sherman, Lieut. H. J. A. HARTIG, Minneapolis.
To report to the commanding general, Central Department, for assignment to duty, Capts. J. D. WEIR, Beardsley; A. G. MOFFATT, Howard Lake.
To Rockefeller Institute for instruction in laboratory work, and on completion *to Army Medical School* for duty, Lieut. H. H. WARNER, St. Paul.
To Rock Island, Ill., for duty, from Camp Custer, Major C. H. CLARK, Duluth.
To San Francisco, Calif., Letterman General Hospital, for duty, from Camp Kearney, Lieut. A. F. STRICKLER, Sleepy Eye.
To Whipple Barracks, Ariz., for duty, from Camp Dodge, Capt. J. W. DANIELS, St. Peter.
The following orders have been revoked *To Fort Oglethorpe* for instruction, Capt. A. MacLAREN, St. Paul; Lieut. A. G. BEYER, Red Wing.

Mississippi

To Azalea, N. C., for duty, from New Haven, Capt. T. D. BOURDEAUX, Meridian.
To Camp Beauregard, Alexandria, La., for duty, from New Orleans, Capt. M. C. HENRY, Bentonia.
To Camp Bowie, Fort Worth, Texas, base hospital, Lieut. H. M. SMITH, Natchez.
To Camp Crane, Allentown, Pa., for temporary duty, from Camp Devens, Lieut. E. E. FARMER, Dockery.
To Camp Greene, Charlotte, N. C., for duty, Lieut. G. C. DAVIS, Leesburg.
To Camp Meade, Admiral, Md., for duty, from Walter Reed General Hospital, Lieut. J. D. SAULS, Clarksdale.
To Fort Oglethorpe for instruction, Lieut. C. RUFF, Tommolen.
To Fort Ontario, N. Y., base hospital, from Camp McClellan, Lieut. J. S. ADAMS, DeKalb.
To New Haven, Conn., for duty, Lieut. B. C. BERNARD, Senatobia.
Honorably discharged, Lieut. C. A. MARTIN, Chunky.

Missouri

To Ann Arbor, Mich., State Psychopathic Hospital, for intensive training, from Camp Pike, Lieut. T. N. TOOMEY, St. Louis.
To Azalea, N. C., for duty, from New Haven, Capt. P. G. PAUGH, St. Louis.
To Camp Crane, Allentown, Pa., for temporary duty, from Camp Fremont, Lieut. G. L. HARRINGTON, Independence.
To Camp Dix, Wrightstown, N. J., for duty, from Hoboken, Lieut. C. H. WESTERMAN, St. Louis.
To Camp Grant, Rockford, Ill., base hospital, Capt. E. T. SENSENEY, St. Louis.
To Camp Hancock, Augusta, Ga., base hospital, from Fort Oglethorpe, Lieut. F. F. HAAS, St. Louis.
To Camp Jackson, Columbia, S. C., base hospital, Lieut. U. S. SHORT, St. Louis.
To Camp Lee, Petersburg, Va., base hospital, Lieut. J. B. McCUBBIN, Fulton.
To Camp Lewis, American Lake, Wash., base hospital, Lieut. H. A. CALVERT, Smithville.
To Camp Logan, Houston, Texas, base hospital, Lieut. L. P. FORGRAVE, St. Joseph.
To Camp Meade, Admiral, Md., with the board examining the troops for tuberculosis, Lieut. F. JAMES, Sheldon.
To Camp Pike, Little Rock, Ark., base hospital, Capt. P. H. SWAHLEN, St. Louis.
To Camp Sevier, Greenville, S. C., base hospital, Lieut. R. M. CATER, Marceline.
To Camp Shelby, Hattiesburg, Miss., base hospital, Lieut. A. L. HERTEL, St. Louis. *To examine the command* for nervous and mental diseases, Capt. M. L. UNDERWOOD, St. Joseph.
To Camp Wadsworth, Spartanburg, S. C., *to examine the command* for nervous and mental diseases, Lieut. E. B. M. CASEY, St. Louis.
To Cape May, N. J., for temporary duty, from Camp Colt, Lieut. J. R. VAUGHAN, St. Louis.
To Fort Oglethorpe for instruction, Capt. W. E. MEANWELL, Columbia, Lieut. E. L. DALLWIG, St. Louis.
To Fort Riley for instruction, Capts. H. BRYAN, Carthage; J. P. VAN ALLEN, Cole Camp; F. L. FINLEY, East Prairie; J. E. MUSGROVE, Excelsior Springs; J. R. MABEE, Huntsville; J. MIDDLETON, Kansas City; R. L. FOGLE, Otterville; B. B. KELLY, Purdy; A. GUNDLACH, C. A. HOBERECHT, JULIUS J. JEUDE, St. Louis; Lieuts. T. J. DRISDEL, Dadeville; M. T. EDMONSON, Fair Grove; W. R. KING, Joplin; P. LUX, Kansas City; J. O. BRADSHAW, Lebanon; J. T. BRICE, Mount Moriah; J. H. YOUNG, Ozark; O. M. CHAMBERLAIN, Rockport; O. T. MOREY, Salisbury.
To Fort Sam Houston, Texas, base hospital, Capts. W. M. WEST, Monett; F. H. SPENDER, St. Joseph. For duty, from Fort Riley, Capt. G. F. ALTON, Barry.
To Fort Sill, Okla., base hospital, from Camp Zachary Taylor, Lieut. O. P. McPHERSON, Kansas City. For duty, from Camp MacArthur, Lieut. J. H. ARMSTRONG, Glendale.
To Newport News, Va., for duty, Capt. T. M. PAUL, St. Joseph, from Camp Crane, Major W. E. LEIGHTON, St. Louis.
To New York, Neurological Institute, for instruction, Lieut. O. B. ZIENERT, St. Louis.
To report to the commanding general, Central Department, for assignment to duty, Capts. O. C. O'KELL, Excelsior Springs; S. D. REYNOLDS, Gower.
Honorably discharged on account of physical disability incurred in line of duty, Lieut. J. W. RICE, Kansas City.
The following orders have been revoked: *To Fort Oglethorpe* for instruction, Capt. C. D. CANTRELL, Kansas City. *To Fort Riley* for instruction, Lieut. J. B. STOKES, St. Louis.

Montana

To Camp Grant, Rockford, Ill., base hospital, Capt. E. W. THUERER, Billings.
To Fort Riley for instruction, Lieuts. F. C. VICARS, Livingston; J. R. McDOWELL, Wibaux.
To New York, Neurological Institute, for instruction, Lieut. A. G. BIDDLE, Butte.

Nebraska

To Camp Custer, Battle Creek, Mich., base hospital, Capt. H. E. BURDICK, David City.
To Fort Oglethorpe for instruction, Lieut. C. S. LENTZ, Omaha.
To Fort Riley, base hospital, Capt. J. J. HOMPES Lincoln. For instruction, Capts. J. P. FEESE, H. C. SMITH, Franklin; R. T. VAN METRE, Fremont; Lieuts. R. R. CRAFT, Exeter; A. A. ASHBY, Fairmont; D. L. BARTLING, Hermon.
To Fort Sam Houston, Texas, for duty, from Fort Riley, Capts. J. G. W. WESTERHOFF, Carleton; C. B. CALBREATH, Hastings.
To Fort Sill, Okla., base hospital, from Camp MacArthur, Lieut. C. D. SPIVEY, Lincoln. For duty, from Camp Kelly, Capt. C. MINNICK, Curtis.
To Lake Charles, La., for duty, from Camp Kelly, Lieut. FRANK H. MORROW, Columbus.
To Watervliet, N. Y., for duty, from Camp Sherman, Capt. J. BUIS, Pender.

Nevada

To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieut. H. A. PARADIS, Bauvard.

New Hampshire

To Camp Greene, Charlotte, N. C., for duty, Lieut. H. R. AMDEN, Concord.
To Camp Meade, Admiral, Md., for duty, Lieut. C. E. HIGHT, Groveton.
To Fort Oglethorpe for instruction, Capt. C. E. JOHNSTON, Portsmouth; Lieuts. E. W. COATES, Farmington; P. J. KITTREDGE, Portsmouth.
To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Wadsworth*, Spartanburg, S. C., base hospital, Capt. G. C. WILKINS, Manchester.

New Jersey

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, Lieut. L. M. COLLINS, Greystone Park.
To Camp Kearney, Linda Vista, Calif., as division surgeon, from Camp Dix, Lieut.-Col. J. L. SINOR.
To Camp MacArthur, Waco, Texas, with the board examining the troops for tuberculosis, from Camp Cody, Capt. G. THORBURN, Newark.
To Camp Meade, Admiral, Md., base hospital, Capt. F. R. SHEPPARD, Millville. For duty, Capt. P. B. CREGAR, Plainfield; Lieut. M. E. GORE, East Orange.
To Camp Shelby, Hattiesburg, Miss., base hospital, from Camp Jackson, Lieut. W. L. THOMPSON, Jersey City.
To Camp Sherman, Chillicothe, Ohio, base hospital, from Army Medical School, Lieut. G. FASANO, Newark.
To Fort McHenry, Md., for temporary duty, from Camp Jackson, Lieut. I. E. DEIBERT, Camden.
To Fort Moultrie, S. C., for duty, Capt. H. S. COSTILL, Trenton.
To Fort Oglethorpe for instruction, Capt. M. J. SULLIVAN, Englewood; Lieuts. C. B. MAXSON, Jersey City; A. W. JUSTIN, Union Hill.
To Fort Sill, Okla., base hospital, from Camp Sevier, Capt. S. T. QUINN, Elizabeth.
To Governors Island, N. Y., for duty, Capt. J. R. POLLARD, Chatham.
To Plattsburg Barracks, N. Y., for duty, Lieut. W. D. SILKWORTH, Newark.
To report to the commanding general, Eastern Department, for assignment to duty, Capts. A. S. MADDOX, Ashbury Park; J. S. HEWSON, Newark.
To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to his proper station*, from Camp Devens, Capts. C. R. NEARE, East Orange; J. S. MACLAY, Paterson.
To Tobyhanna, Pa., for duty, Capt. G. W. FITHIAN, Perth Amboy.
The following orders have been revoked: *To Camp Forrest*, Chickamauga Park, Ga., for duty, Lieut. JOHN P. REEVES, Elmer. *To Camp Meade*, Admiral, Md., for duty, Lieut. R. STEWART, Secaucus. *To Camp Sherman*, Chillicothe, Ohio, base hospital, from Camp Dix, Capt. A. F. McBRIDE, Paterson. *To Camp Wadsworth*, Spartanburg, S. C., for duty, from Hampton, Lieut. J. G. COLEMAN, Hamburg. *To Fort Oglethorpe* for instruction, Capt. J. L. FEWSMITH, Newark. *To Garden City, L. I., N. Y.*, for duty, Lieut. R. D. HENDERSON, Jersey City.

New Mexico

To Camp Cody, Deming, N. M., base hospital, Capt. D. D. SWEARINGEN, Roswell.

New York

To Azalea, N. C., for duty, from New Haven, Lieuts. H. J. SEIFF, New York; S. L. WANG, Staten Island.
To Camp Abraham Eustis, Lee Hall, Va., for duty, Lieut. B. R. BASS, Brooklyn.
To Camp Crane, Allentown, Pa., base hospital, from Fort Riley, Lieut. A. M. RABINER, Albany. For temporary duty, from Camp Joseph E. Johnston, Lieut. H. HERSHBERG, New York; from Camp Upton, Capt. C. F. CLAASSEN, Brooklyn; from Fort Oglethorpe, Lieut. S. S. FERN, New York. *To examine the command* for nervous and mental diseases, from Camp Custer, Lieut. B. GLUECK, Ossining.
To Camp Custer, Battle Creek, Mich., base hospital, Major T. H. McKEE, Buffalo. *To examine the command* for nervous and mental diseases, from Mineola, Major A. S. MOORE, Middletown.
To Camp Devens, Ayer, Mass., base hospital, Lieuts. A. T. JACOBS, New York; F. F. McCAULEY, Schenectady. From Camp Sheridan, Major L. T. GRIFFITH, New York. From Rockefeller Institute,

Capt. A. H. TERRY, New York. For duty, Capt. S. W. BRADSTREET, Irondequoit; Lieuts. H. P. JOFFMAN, Buffalo; F. S. WESTMORELAND, New York.

To Camp Dix, Wrightstown, N. J., base hospital, Lieut. J. P. HENNESSY, New York. For duty, Lieut. M. L. SOLKOW, New York.

To Camp Dodge, Des Moines, Ia., base hospital, from Fort Des Moines, Capt. K. E. WILLIAMS, Rome.

To Camp Greene, Charlotte, N. C., for duty, Lieuts. H. T. CARTWRIGHT, C. H. ROGERS, New York.

To Camp Hancock, Augusta, Ga., base hospital, Lieut. J. COLOMB, New York.

To Camp Jackson, Columbia, S. C., base hospital, from Camp Hancock, Capt. J. H. EVANS, Virgil, from Waynesville, Capt. M. E. LEARY, Rochester.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. D. J. TILLON, Elmira.

To Camp Lee, Petersburg, Va., base hospital, Capt. J. R. GRAHAM, New York.

To Camp Lewis, American Lake, Wash., base hospital, from Fort Sam Houston, Lieut. A. G. DE SANCTIS, New York.

To Camp MacArthur, Waco, Texas, for duty, from Fort Sill, Lieut. L. D. CREMIN, Ossining.

To Camp McClellan, Anniston, Ala., base hospital, Capt. F. M. O'GORMAN, Buffalo.

To Camp Meade, Admiral, Md., base hospital, Lieut. J. W. BABCOCK, New York. For duty, Lieut. J. L. BOTH, Edgemore, L. I. *To examine the command* for nervous and mental diseases, Capt. T. I. TOWNSEND, Binghamton. With the board examining the troops for cardiovascular diseases from Fort Thomas, Capt. H. JAMES, New York.

To Camp Shelby, Hattiesburg, Miss., base hospital, from Camp Jackson, Lieut. P. W. FETZER, New York.

To Camp Travis, Fort Sam Houston, Texas, for duty, from Camp MacArthur, Lieut. L. L. HOLLENBECK, New York.

To Camp Upton, L. I., N. Y., with the board examining the command for nervous and mental diseases, Lieut. H. E. SCHORR, New York.

To Camp Wadsworth, Spartanburg, S. C., base hospital, Capt. D. WEST, New York. For duty, from Camp Meade, Lieut. P. J. HIRST, Middle Grove.

To Camp Wheeler, Macon, Ga., base hospital, from Baltimore, Capt. C. H. SANFORD, New York.

To Camp Zachary Taylor, Louisville, Ky., for duty, from Camp Sherman, Capt. D. R. ROBERT, Brooklyn.

To Carlisle, Pa., for duty, from Camp Devens, Lieut. H. SMITH, New York.

To Fort Des Moines, Ia., base hospital, from Camp Sevier, Major T. WRIGHT, Buffalo.

To Fort McHenry, Md., for temporary duty, from Camp Jackson, Lieut. R. H. OPPENHEIMER, Blackwell's Island.

To Fort Monroe, Va., for duty, from Fort McPherson, Lieut. W. W. BELL, New York.

To Fort Niagara, N. Y., for duty, Capt. N. B. FORD, Owasco.

To Fort Oglethorpe as instructor, Major W. H. STEWART, New York. For instruction, Major O. M. SCHWERDTFEGER, New York; Capts. G. T. WILSON, Hoosick Falls; F. S. HEIMER, Mt. Upton; J. J. HARRINGTON, New York; Lieuts. M. T. RAUH, L. D. VOLK, Brooklyn; M. A. MURPHY, Hoosick Falls; T. J. RYAN, New York.

To Fort Ontario, N. Y., base hospital, from Camp McClellan, Lieut. W. L. WEEDEN, Clifton Springs.

To Fort Sill, Okla., base hospital, from Camp Bowie, Lieut. A. G. MOTT, Yonkers.

To Fort Snelling, Minn., for duty, from Camp Grant, Major A. S. CLARK, New York.

To Hampton, Va., Langley Field, for temporary duty, from Fort Oglethorpe, Lieut. S. S. INGALLS, Parish.

To Hoboken, N. J., for duty, from Camp Sevier, Lieut. M. T. KOVEN, Brooklyn.

To Hot Springs, Ark., for temporary duty, from Camp Colt, Lieut. M. O. HOWARD, New York.

To Lakewood, N. J., for temporary duty, Capt. J. B. RINGLAND, Oswego.

To New Haven, Conn., for duty from Otisville, Capt. T. F. ELLIS, New York. *To Yale Army Laboratory School* for instruction, Lieut. D. M. MARKOFSKY, New York; from Fort Leavenworth, Lieut. D. JUNG, Buffalo.

To New York, Bellevue Hospital, for instruction, and on completion *to his proper station*, from Camp Jackson, Lieut. W. C. MACDONALD, New York; from Camp Meade, Lieut. F. C. CARR, New York; from Camp Zachary Taylor, Lieut. R. G. CARLIN, New York. Neurological Institute, for intensive training, Lieut. M. KOHLENBERG, Brooklyn.

To Plattsburg Barracks, N. Y., for duty, Lieut. J. W. MAMBERT, Hudson; from Camp Wheeler, Capt. C. K. VAUX, Central Islip, from Fort Porter, Capt. J. G. STOWE, Buffalo.

To Rockefeller Institute for instruction in the treatment of infected wounds and on completion to Camp Devens, Ayer, Mass., base hospital, Capt. W. M. HALSEY, Oswego; Lieut. E. F. BRIGGS, Bedford Hills. On completion *to Camp Greene*, Charlotte, N. C., base hospital, Capt. C. E. FARR, New York. On completion *to Camp Upton, L. I., N. Y.*, base hospital, Lieut. T. J. Ryan, New York.

To Syracuse, N. Y., for duty, from Camp Crane, Capt. D. E. BRACE, New York.

To Washington, D. C., St. Elizabeth's Hospital, for duty, from Walter Reed General Hospital, Capt. H. L. RAYMOND, Collins.

To Waynesville, N. C., for duty, from New Haven, Capt. E. C. JOYCE, New York.

To Wichita Falls, Texas, as flight surgeon, from Mineola, Capt. S. A. MUNFORD, Ithaca.

Honorably discharged on account of physical disability existing prior to entrance into the service, Capt. F. W. FILSINGER, Buffalo; Lieut. D. M. GILDERSLEEVE, Brooklyn.

The following orders have been revoked: *To Camp Abraham Eustis*, Lee Hall, Va., base hospital, from Camp Lee, Capt. E. G. MACFARLAND, Clinton. Camp hospital, Lieut. J. L. EVERLOG, Brooklyn. *To Fort Oglethorpe* for instruction, Lieut. W. STEINHAUSER, New York.

North Carolina

To Camp A. A. Humphreys, Accotink, Va., for temporary duty, Lieut. A. P. KELLY, Carthage.

To Camp Dix, Wrightstown, N. J., for temporary duty, Lieut. B. M. BRADFORD, Hope Mills.

To Camp Dodge, Des Moines, Ia., for duty, from Fort Oglethorpe, Lieut. L. E. GUION, Waxhaw.

To Camp Greene, Charlotte, N. C., for duty, Capt. M. J. KING, Durham.

To Fort Oglethorpe for instruction, Lieut. C. McGOWAN, Plymouth.

To Fort Ontario, N. Y., base hospital, from Camp Devens, Lieut. R. L. DANIELS, Goldsboro.

To Fort Slocum, N. Y., for duty, from Fort Thomas, Capt. A. DURHAM, Charlotte.

Honorably discharged on account of physical disability existing prior to entrance into the service, Capt. A. H. HARRISS, Wilmington.

The following order has been revoked: *To Camp Wadsworth*, Spartanburg, S. C., for duty, from Southeastern Department, Lieut. M. R. FARRAR, Greensboro.

North Dakota

To Fort Riley for instruction, Lieut. W. C. WILSON, Grand Forks.

Ohio

To Ann Arbor, Mich., State Psychopathic Hospital for intensive training, from Camp Sherman, Lieut. A. E. KISER, Cincinnati.

To Belleville, Ill., Scott Field, for duty, Lieut. A. J. SHOEMAKER, Columbus.

To Camp Crane, Allentown, Pa., for temporary duty, from Camp Pike, Lieut. O. E. TOWNSEND, Cleveland; from Des Moines, Major F. C. HERRICK, Cleveland.

To Camp Custer, Battle Creek, Mich., for duty, Lieuts. A. H. CALHOUN, Canton; M. P. MOTTO, Cleveland; P. C. COLEGROVE, Oberlin.

To Camp Devens, Ayer, Mass., for duty, Lieut. L. E. KERR, Toledo.

To Camp Dix, Wrightstown, N. J., for temporary duty, Lieuts. J. C. STAATS, Cincinnati; W. L. LATHROP, Metamora.

To Camp Greene, Charlotte, N. C., base hospital, Capt. B. B. KIMMEL, Cleveland,. For duty, Capt. O. P. KIMMEL, New Madison.

To Camp Meade, Admiral, Md., base hospital, Capt. A. M. STEINFELD, Columbus. For duty, Capt. J. A. HURT, Cleveland; Lieut. F. J. J. LEHMANN, Toledo; from Washington, Capt. H. L. TAYLOR, Cleveland.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Oglethorpe, Lieut. W. A. DEERHAKE, St. Mary's.

To Camp Sherman, Chillicothe, Ohio, base hospital, Capt. G. C. SULLIVAN, Dayton.

To Camp Zachary Taylor, Louisville, Ky., base hospital, Lieut. F. B. CROSS, Cincinnati.

To Cleveland, Ohio, Lakeside Hospital, for duty, Lieut. R. G. PEARCE, Cleveland. To examine applicants, Lieut. C. A. BOWERS, Cleveland.

To Fort McHenry, Md., for duty, from Washington, Capt. M. G. BALDWIN, Toledo.

To Fort McPherson, Ga., for duty, from New York, Lieut. C. H. Hyman, Payne.

To Fort Meyer, Ga., for duty, Capt. I. H. HUNTER, Toledo.

To Fort Monroe, Va., for duty, from Fort McPherson, Lieut. N. C. MAYER, Cleveland.

To Fort Niagara, N. Y., for duty, Lieut. W. E. KNEALE, Akron.

To Fort Oglethorpe for instruction, Capts. J. A. LYTLE, Cleveland; L. B. ZINTAMASTER, Massilon; Lieuts. W. J. SMITH, Arcanum; A. M. SHAFER, Canal Fulton; H. L. WELLS, Cambridge; H. C. WAYBLE, Cincinnati; R. S. DINSMORE, H. S. THOMPSON, Cleveland; R. R. BOND, Dayton; H. C. WAITE, Columbus; G A MILLER, Hudson; H. B. VAN RYNING, Lakewood; T. P. JOHNSTON, Mount Gilead; E. V. BERRY, Newscomerstown; W. P. ULTES, Springfield; H. K. BECKWITH, Toledo.

To Governors Island, N. Y., for duty, Lieuts. C. S. CAVETT, North Baltimore.

To Hampton, Va., Langley Field, for duty, Lieut. R. E. FINLEY, Xenia.

To Hoboken, N. J., for temporary duty, from Camp A. A. Humphreys, Major F. WINDERS, Columbus.

To Hot Springs, N. C., for temporary duty, from Army Medical School, Lieut. R. B. STEVENSON, Columbus.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. J. H. WARVEL, Bradford.

To New York, Bellevue Hospital, for instruction, and on completion *to Camp Jackson*, Columbia, S. C., base hospital, Lieut. G. W. MILLER, Columbus. On completion *to Camp Lee*, Petersburg, Va., base hospital, Capt. U. K. EESSINGTON, Newark. On completion *to his proper station*, from Camp Jackson, Lieut. M. S. GRIFFITH, Batavia. Neurological Institute, for instruction, from Camp Jackson, Lieut. B. B. NEUBAUER, Cleveland.

To Pittsburgh, Pa., for duty, Capt. R. R. HENREDSHOTT, Tiffin.

To Rochester, N. Y., to examine drafted men, from Camp Lee, Lieut. B. H. GILLESPIE, Akron.

To Syracuse, N. Y., for duty, from Camp Upton, Lieut. F. B. SNODGRASS, Kenton.

Honorably discharged on account of physical disability existing prior to entrance into the service, Lieut. F. T. MILES, Salem.

The following orders have been revoked: *To Camp Crane*, Allentown, Pa., for duty, Lieut. J. E. McCLELLAND, Cleveland. *To Fort Oglethorpe* for instruction, Lieut. H. GRAEFE, Sandusky.

Oklahoma

To Camp A. A. Humphreys, Accotink, Va., base hospital, Capt. J. M. COOPER, Oklahoma City.

To Camp Cody, Deming, N. M., base hospital, Lieut. H. P. PRICE, Tulsa. For duty, Capt. S. C. DAVIS, Oklahoma City.

To Camp Hancock, Augusta, Ga., base hospital, from Fort Oglethorpe, Lieut. R. L. WESTOVER, Okmulgee.

To Camp Lewis, American Lake, Wash., base hospital, from Camp Travis, Lieut. T. A. HARTGRAVES, Soper.

To Camp McClellan, Anniston, Ala., for duty, Lieut. C. H. MORRIS, Vion.

To Camp Travis, Fort Sam Houston, Texas, base hospital, Lieut. B. C. RUTHERFORD, Oilton.

To Fort Bayard, N. M., for duty, from Camp Travis, Lieut. W. R. LEVERTON, Hobart.

To Fort Oglethorpe for instruction, Lieut. W. M. GALLAGHER, Shawnee.

To Fort Riley for instruction, Lieuts. W. H. KINGMAN, Bartlesville; T. T. CLOHESSY, Berlin; F. E. SADLER, Coalgate; L. L. SMITH, Keifer; E. E. GOODRICH, Tecumseh; W. J. TRAINOR, Tulsa; J. A. MUNN, Wilburton.

To Fort Sam Houston, Texas, for duty, from Fort Riley, Lieuts. E. J. REICHLEY, Helena; C. E. SEXTON, Stillwater.

To Fort Sill, Okla., base hospital, from Camp Bowie, Lieut. M. H. FOSTER, Alderson.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. V. L. McPHERSON, Boswell.

To Newport News, Va., as orthopedic surgeon, from Fort Oglethorpe, Lieut. W. H. DERSCH, Carmen.

To New York, Bellevue Hospital, for instruction, and on completion *to his proper station,* from Camp A. A. Humphreys, Major R. L. KURTZ, Nowata.

To report to the commanding general, Southern Department, for assignment to duty, Capt. J. M SALTER, Sulphur; from Camp Cody, Lieut. C. W. ALEXANDER, Temple.

Oregon

To Camp Meade, Admiral Md., for duty, from Camp Abraham Eustis, Lieut. E. J. GAMBLE, Portland.

To Fort Riley for instruction, Lieuts. G. E. RIGGS, Albany; H. J. SCHENK, Lebanon.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Capt. J. H. THOMPSON, Enterprise.

To New York, Neurological Institute, for instruction, Lieut. G. N. PEASE, Portland.

To report to the commanding general, Western Department, for assignment to duty, Lieut. C. H. FRANCIS, Bond.

Panama

To Camp Sheridan, Montgomery, Ala., as assistant to camp surgeon, from Canal Zone, Major W. C. H. PROSSER.

To Camp Wadsworth, Spartanburg, S. C., as assistant to camp surgeon, from Canal Zone, Major C. LE BARON.

Pennsylvania

To Camp A. A. Humphreys, Accotink, Va., for duty, from Camp Meade, Lieut. E. H. REBHORN, Scranton.

To Camp Cody, Deming, N. M., base hospital, Lieut. J. L. ZIMMERMAN, Hershey.

To Camp Crane, Allentown, Pa., for temporary duty, from Camp Custer, Capt. C. H. STIMSON, Philadelphia; from Camp Dix, Lieut. H. H. LAMB, Braddock, from Camp Gordon, Lieut. N. W. WINKELMAN, Bridgeville; from Camp Grant, Lieut. H. I. NEWCOMET, Reading; from Camp Jackson, Lieut. G. S. VOGAN, Pittsburgh; from Camp Sherman, Lieut. F. FRALEY, Philadelphia; from Washington, Lieut. H. L. CARNCROSS, Philadelphia.

To Camp Devens, Ayer, Mass., base hospital, Lieut. J. E. WYATT, Fountain Springs. For duty, Capt. I. N. FREYMAN, Weatherly; Lieut. T. R. FERGUSON, Kirkwood.

To Camp Dix, Wrightstown, N. J., base hospital, Capt. L. D. SARGENT, Washington. For temporary duty, Lieut. D. L. McCANDLESS, Butler.

To Camp Dodge, Des Moines, Iowa, base hospital, Capt. C. S. CALDWELL, Swissvale.

To Camp Greene, Charlotte, N. C., for duty, Capt. L. C. ROWLES, Clearfield.

To Camp Hancock, Augusta, Ga., base hospital, Capt. F. B. UTLEY, Pittsburgh; Lieut. J. S. MORGAN, Crafton.

To Camp Holabird, Baltimore, Md., for duty, Lieut. F. G. STUBBS, Philadelphia, from Walter Reed General Hospital, Lieut. E. J. KALODNER, Philadelphia.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. R. J. FORD, Pittsburgh; from Walter Reed General Hospital, Lieut. J. A. PERKINS, Philadelphia.

To Camp Las Casas, San Juan, P. R., for duty, Capt. J. E. MADARA, Mauch Chunk.

To Camp Lee, Petersburg, Va., base hospital, Capts. W. K. SWANN, Monroe; W. H. MORROW, Swissvale; Lieuts. E. M. HUGHES, Butler; V. P. VIESLET, Charlaroi; E. D. RUSSELL, Reamstown.

To Camp Meade, Admiral, Md., as orthopedic surgeon, from Boston. Capt. C. A. COHN, Lancaster. Base hospital, Capt. R. M. ALEXANDER, Reading. For duty, Lieuts. S. J. DICKEY, Conneautville; M J. SCHWARTZ, Philadelphia; W. L. GROUNDS, Roaring Springs; from Camp Hancock, Lieut. C. O. W. BARTINE, Philadelphia.

To Camp Sevier, Greenville, S. C., as sanitary inspector, from Fort Oglethorpe, Major W. K. EVANS, Chester.

To Camp Sheridan, Montgomery, Ala., base hospital, Capt. M. W. REED, Bellefonte. For duty, Fort Oglethorpe, Lieut. D. R. SZABO, Duquesne.

To Camp Wadsworth, Spartanburg, S. C., base hospital, Lieut. J. E. FERRINGER, Stoneboro. For duty, Lieuts. F. G. WRIGHT, Chambersburg; W. M. McWILLIAMS, Hillsville; from Camp Devens, Lieut. F. D. LEVY, Philadelphia.

To Camp Wheeler, Macon, Ga., base hospital, Capt. A. M. STEVENSON, Pittsburgh.

To Charleston, S. C., for duty, Lieut. J. P. SHAW, Pittsburgh.

To Fort Des Moines, Iowa, base hospital, from Camp Dodge, Lieut. A. K. CORT, Wilson.

To Fort Monroe, Va., for duty, Major E. LAPLACE, Philadelphia; from Fort McPherson, Lieut. W. J. BASLER, Harrisburg.

To Fort Niagara, N. Y., for duty, Major S. M. HUFF, Bellefonte; Capt. J. N. W. ANDERSON, Pittsburgh.

To Fort Oglethorpe for instruction, Capts. G. L. McKEE, Burgettstown; G. E. PATTERSON, Washington; Lieuts. J. P. EGAN, Braddock; C. B. NORCROSS, Clairton; P. T. HOHE, Mercer; T. J. McGURL, Minersville; J. SHATACK, Nesquehoning; M. B. BERNARD, Philadelphia; A. F. KAMENS, J. D. KISTLER, Pittsburgh; G. I. YEARICK, Portage; H. E. MASSY, Sharon.

To Fort Ontario, N Y., base hospital, from Camp Dix, Lieut. M. A. BLUMER, Pittsburgh; from New York, Lieut. G. L. LAVERTY, Harrisburg. For duty, from New York, Lieut. J. E. DWYER, Polk.

To Fort Thomas, Ky., for duty, from Columbus Barracks, Lieut. S. W. MILLER, JR., Lancaster.

To Governors Island, N. Y., for duty, Lieut. H. W. TITTLE, New Florence.

To Houston, Tex., Ellington Field, as flight surgeon, from Millington, Major R. J. HUNTER, Philadelphia.

To Lakewood, N. J., for temporary duty, Capt. W. P. HUGHES, Pittsburgh.

To Mineola, L. I., N. Y., Hazelhurst Field, for instruction, Capt. J. H. McKEE, Philadelphia.

To New Haven, Conn., for duty, Lieuts. N. D. MACARTAN, Cresson; M. DEPTA, Pittsburgh. *To Yale Army Laboratory School,* for instruction, Lieuts. J. A. COEN, Briestoria; A. D. WALTZ, Philadelphia.

To New York, Neurological Institute, for instruction, Capt. R. J. BEHAN, Pittsburgh; Lieuts. A. B. HAMILTON, Freeland; R. P. BATCHELOR, Palmerton.

To Pittsburgh, Pa, for duty, Lieut. J. M. MONAGHAN, Minersville.

To report by wire to the commanding general, Eastern Department, for assignment to duty, Capt. S. O. BRUMBERG, Huntingdon.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Dix,* Wrightstown, N. J., base hospital, Lieut. W. E. GARDNER, Pittsburgh. On completion *to Camp Hancock,* Augusta, Ga., base hospital, Capt. W. C. MINNICH, McKees Rock. On completion *to Camp Wadsworth,* Spartanburg, S. C., base hospital, Lieut. J. P. HARLEY, Williamsport. On completion *to his proper station,* from Camp Dix, Lieut. L. C. RUMMAGE, Sweet Valley; from Camp McClellan, Lieut. M. E. SMOCZYNSKI, Philadelphia.

To Tuscaloosa, Ala., University of Alabama, for duty, from Camp Wadsworth, Lieut. J. STEIN, Scranton.

To Walter Reed General Hospital, Takoma Park, D. C., for temporary duty, Lieut. I. WILLIAMS, Pittsburgh; from the Surgeon-General's Office, Lieut. S. B. PEARCE, Pittsburgh.

Honorably discharged on account of physical disability existing prior to entrance into the service, Capt. R. K. WILSON. Jeannette; Lieut. J. L. HEARD, North East.

The following orders have been revoked: *To Camp Bowie,* Fort Worth, Tex., base hospital, from Southern Department, Lieut. D. M. AIKMAN, Brockwayville. *To Camp Shelby,* Hattiesburg, Miss., base hospital, from Fort McPherson, Capt. S. D. INGHAM, Philadelphia. *To Fort Oglethorpe* for instruction, Lieut. H. M. HALL, JR., Pittsburgh. *To Walter Reed General Hospital* for observation and treatment, Capt. C. D. E. PANNACI, Gloversville.

Rhode Island

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. T. S. FLYNN, Woonsocket.

To Camp Lewis, American Lake, Wash., base hospital, from Camp Fremont, Major J. HAMILTON, JR., Providence.

To Camp Meade, Admiral, Md., for duty, Lieut. H. DEWOLF, Bristol.

To Fort Oglethorpe for instruction, Capt. N. C. BAKER, Providence.

To Governor's Island, N. Y., for duty, Capt. H. W. HEATON, Providence.

South Carolina

To Camp Greene, Charlotte, N. C., base hospital, Lieut. J. R. SPARKMAN, Spartanburg. For duty, Capt. J. H. LAWRENCE, Pendleton; Lieuts. J. C. HILL, Abbeville; R. M. FULLER, McCormick.

To Camp Kearney, Linda Vista, Calif., as assistant to the division surgeon, from Fort Oglethorpe, Lieut. T. MADDOX, Union.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Oglethorpe, Lieut. V. M. ROBERTS, Blackburg.

To Camp Wadsworth, Spartanburg, S. C., for duty, Lieut. J. W. MOLE, Brinson.

To Camp Wheeler, Macon, Ga., base hospital, Lieut. R. H. LONG, Carlisle.

To Fort Oglethorpe for instruction, Capts. L. A. RISER, Columbia; J. W. VALLEY, Pickens.

To Hoboken, N. J., for temporary duty, from Camp Devens, Lieut. J. D. COLSON, St. Stephen.

South Dakota

To Biltmore, N. C., for temporary duty, from Camp Custer, Capt. A. V. ELLIOTT, Beresford.

To Camp Custer, Battle Creek, Mich., for duty, Lieut. F. W. FLETCHER, Tyndall.

To Camp Dodge, Des Moines, Iowa, base hospital, Lieut. H. L. CRANE, Lead.

To Camp Grant, Rockford, Ill., base hospital, Capt. F. E. CLOUGH, Lead; Lieuts. T. J. DEVEREAUX, Aberdeen; V. R. HODGES, Terry.

To Camp Sherman, Chillicothe, Ohio, base hospital, Capt. C. F. CULVER, Sioux Falls.

To Fort Oglethorpe for instruction, Lieut. F. D. GILLIS, Mitchell.

To Fort Riley, base hospital, from Camp Grant, Capt. J. F. ADAMS, Aberdeen; from Camp Travis, Lieut. A. P. KIMBALL, Colome. For instruction, Lieuts. W. W. STEVENSON, Vermillion; R. B. FLEEGER, Lead; I. J. MARKEL, Lead.

Tennessee

To Ann Arbor, Mich., State Psychopathic Hospital, for intensive training, from Camp Gordon, Lieut. J. P. SCHELL, Nashville.

To Azalea, N. C., for duty, from New Haven, Lieuts. L. T. STEM, B. SULLIVAN, Chattanooga.

To Camp Crane, Allentown, Pa., for temporary duty, from Camp A. A. Humphreys, Lieut. S. H. BARRETT, Chattanooga.

To Camp Custer, Battle Creek, Mich., for duty, Lieut. J. R. MILLER, Joelton.

To Camp Greene, Charlotte, N. C., for duty, Lieut. B. E. DELOSIER, Townsend.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. G. T. WILHELM, Memphis.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Oglethorpe, Lieut. L. O. WILKERSON, Stanton.

To Fort Oglethorpe for instruction, Capt. G. F. ST. JOHN, Harriman; J. D. BREWER, Newbern; J. E. NELSON, Rockwood; Lieuts. B. S. MAYO, Dresden; D. L. JONES, Dukedom; M. THARP, Nashville.

To Fort Sill, Okla., base hospital, from Camp Bowie, Lieuts. W. D. RICHARDS, Elowah; S. HUNT, Knoxville.

To Hoboken, N. J., base hospital, from Fort Oglethorpe, Lieut. J. A. McINTOSH, Memphis.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. R. H. DENHAM, Lynnville.

Texas

To Ann Arbor, Mich., State Psychopathic Hospital, for intensive training, from Camp Travis, Lieut. C. W. STEVENSON, Loraine.

To Camp Bowie, Fort Worth, Tex., base hospital, Lieut. C. H. BROOKS, Waco.

To Camp Cody, Deming, N. M., for duty, Lieut. R. K. SMITH, Elmendorf.

To Camp Logan, Houston, Tex., base hospital, Capt. A. S. LOVE, Ballinger; Lieut. W. TAYLOR, Victoria.

To Camp MacArthur, Waco, Tex., base hospital, Lieut. E. W. RHEINHEIMER, El Paso.

To Camp McClellan, Anniston, Ala., for duty, Lieuts. T. P. LYNCH, Coleman; F. RANDOLPH, Como; J. L. AUSTIN, Rock Wall; W. F. LONG, Sulphur Springs.

To Camp Sevier, Greenville, S. C., base hospital, Lieut. R. G. FERGUSON, Dallas.

To Camp Shelby, Hattiesburg, Miss., base hospital, from Camp MacArthur, Major J. G. FLYNN, Galveston.

To Camp Sheridan, Montgomery, Ala., for duty, from Fort Oglethorpe, Capt. J. C. MICHAEL, Houston; Lieut. ST. J. R. MURCHISON, Marshall.

To Camp Sherman, Chillicothe, Ohio, for temporary duty, from Fort Oglethorpe, Lieut. C. H. TILLOTSON, Dalhart.

To Camp Travis, Fort Sam Houston, Tex., base hospital, Capts. I. J. MORRIS, Dallas; A. M. FREELS, Denison.

To Camp Upton, L. I., N. Y., for duty, from Camp MacArthur, Major S. NORMAN, Texas City.

To Fort Oglethorpe for instruction, Capts. D. A. MANN, Beaumont; W. C. DURINGER, Fort Worth; Lieuts. R. E. HILBURN, Antelope; B. E. PICKETT, Big Wells; H. E. ROGERS, El Paso; E. RANDALL, Jr., Galveston; C. C. HOWARD, Garner; T. M. GORDON, Stephenville; W. L. McWHIRTER, Waco; from Army Medical School, Lieut. J. R. HOLDERNESS, Commerce.

To Fort Riley, base hospital, Capt. B. U. SIMS, Bryan. For instruction, Capts. F. D. TEAS, Canadian; J. H. JERNIGAN, Childress; L. R. SMITH, Tyler; Lieut. L. PENROD, Gonzales.

To Fort Sam Houston, Tex., for duty, from Camp Travis, Lieut. M. E. HASTINGS, Galveston; from Fort Riley, Capt. J. A. DENMAN, Belton.

To Fort Sill, Okla., base hospital, from Camp Beauregard, Lieut. E. L. GRAHAM, McGregor, from Camp Wheeler, Capt. T. R. SEALY, Santa Anna. For duty, from Camp Kelly, Capt. W. F. BONNER, San Antonio; Lieut. D. L. LOWRY, Deus.

To Houston, Tex., Signal Corp Aviation School, for duty, from Camp Gordon, Lieut. J. H. HICKS, Elkhart.

To New Haven, Conn., for duty, from Camp Bowie, Lieut. C. R. GOWEN, Carlsbad. Yale Army Laboratory School, for instruction, Lieut. J. M. HARRIS, Fort Davis.

To report by wire to the commanding general, Southern Department, for assignment to duty, Capts. J. T. WATSON, Dallas; G. C. LAMB, El Paso; Lieut. B. A. RUSSELL, Southmayd.

The following orders have been revoked: *To Camp Lee*, Petersburg, Va., base hospital, Lieut. A. M. HUFFMAN, Polytechnic. *To Camp Wadsworth*, Spartanburg, S. C. for duty, from Camp Humphreys, Lieut. O. H. TIMMINS, San Antonio. *To New Haven, Conn.*, for duty, from Camp MacArthur, Lieut. A. J. STREIT, Marlin.

Utah

To Camp Fremont, Palo Alto, Calif., base hospital, Capt. F. N. McHUGH, Salt Lake City.

To Fort Riley, base hospital, Capt. A. J. MURPHY, Salt Lake City. For instruction, Capt. J. U. GIESY, Salt Lake City.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. P. S. HAGEMAN, Bingham Canyon.

To Talmadge, Calif., Mendocino State Hospital, for intensive training, Lieut. F. J. CURTIS, Salt Lake City.

Vermont

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Camp Upton, Lieut. C. N. PERKINS, Burlington.

To Camp Meade, Admiral, Md., for duty, Capt. E. M. CRANE, Hardwick; Lieut. A. E. WARREN, Warren.

To Fort Oglethorpe for instruction, Lieut. W. H. GRINNELL, Rutland.

To Millington, Tenn., Park Field, as flight surgeon, from Fort Worth, Capt. A. L. LARNER, Burlington.

Virginia

To Camp Abraham Eustis, Lee Hall, Va., base hospital, from Newport News, Lieut. R. K. STACY.

To Camp Dix, Wrightstown, N. J., for temporary duty, Lieut. R. H. BROCKWELL, Barnetts.

To Camp Greene, Charlotte, N. C., for duty, Capt. E. C. LEVY, Richmond.

To Camp Logan, Houston, Tex., for duty, from Washington Barracks, Major L. Powell, Alexander.

To Camp Meade, Admiral, Md., for duty, Lieut. F. P. NELSON, Crozet.

To Camp Sevier, Greenville, S. C., as division surgeon, from Camp Lee, Lieut.-Col. C. E. FRONK.

To Camp Zachary Taylor, Louisville, Ky., for duty, from Fort Monroe, Major B. HILLSMAN, Richmond.

To Fort Oglethorpe for instruction, Lieut. J. L. HANKINS, Fordwick.

To Fort Ontario, N. Y., for temporary duty, from Fort Monroe, Major J. W. HOPE, Hampton.

To Newport News, Va., as orthopedic surgeon, from Fort Oglethorpe, Lieut. J. M. FADELEY, Falls Church.

To New York, Neurological Institute, for instruction, Lieut. J. L. McDONALD, Richmond.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Dix*, Wrightstown, N. J., base hospital, Capt. J. H. COLE, Bennington.

The following order has been revoked: *To Fort Oglethorpe* for instruction, Lieut. E. M. CORNS, Gate City.

Washington

To Camp Dodge, Des Moines, Iowa, base hospital, from Vancouver Barracks, Lieut. L. B. COLLIER, Seattle.

To Camp Lewis, American Lake, Wash., base hospital, Lieut. W. H. CARVER, Yakima.

To Camp Logan, Houston, Texas, as division surgeon, from Camp Lewis, Major H. M. WALSON.

To Camp Meade, Admiral, Md., for duty, Lieut. F. P. NELSON, Eustis, Capt. F. H. COLLINS, Goldendale.

To Fort Ontario, N. Y., base hospital, from Camp Lewis, Capt. A. H. PEACOCK, Seattle; from Jefferson Barracks, Lieut. G. I. HURLEY, Hoquaim.

To Fort Riley for instruction, Capt. H. A. MOUNT, Waitsburg; Lieut. F. A. LONGAKER, Olympia; G. BURKE, Tacoma.

To Fort Slocum, N. Y., for duty, from Camp Dix, Lieut. K. S. STAATS, Tacoma.

To San Francisco, Letterman General Hospital, for temporary duty, Lieut. S. E. ROSENTHAL, Spokane.

The following order has been revoked: *To Fort Oglethorpe*, for instruction, Lieut. R. S. VAN PELT, Tacoma.

West Virginia

To Camp Crane, Allentown, Pa., for temporary duty, from Fort McPherson, Lieut. J. E. HUBBARD, Hinton.

To Camp Greene, Charlotte, N. C., for duty, Lieut. H. A. TURK, Newell.

To Camp Meade, Admiral, Md., with the board examining the troops for tuberculosis, from New Haven, Lieut. J. W. GILMORE, Wheeling.

To Camp Shelby, Hattiesburg, Miss., base hospital, from Camp Jackson, Lieut. L. J. BUTLER, Hansford.

To Fort Caswell, N. C., for duty, Capt. A. L. PETERS, Fairmont.

To Fort Oglethorpe for instruction, Lieut. C. R. McGUFFIE, McMechen.

To Walter Reed General Hospital, Takoma Park, D. C., for duty, from Fort Porter, Capt. C. A. BARLOW, Beverly.

The following order has been revoked: *To Fort Oglethorpe* for instruction, Capt. J. W. McDONALD, Fairmont.

Wisconsin

To Azalea, N. C., for duty, from New Haven, Lieut. A. A. PLEYTE, Delafield; Lieut. E. P. ALLEN, Waukesha.

To Camp Custer, Battle Creek, Mich., base hospital, Capt. W. ACKERMAN, Milwaukee; Lieut. G. C. WAUFLE, Jamesville. For duty, Lieuts. F. G. DUTTON, Green Bay; G. A. THIELKE, Wausau.

To Camp Grant, Rockford, Ill., base hospital, Lieut. J. B. VEDDER, Marshfield. For duty, Lieut. M. A. FRONEY, Racine.

To Camp Hancock, Augusta, Ga., base hospital, from Fort Riley, Capt. W. P. FORKIN, Chilton.

To Camp Joseph E. Johnston, Jacksonville, Fla., for duty, from Fort Oglethorpe, Lieut. C. N. SONNENBURG, Sheboygan.

To Camp Sevier, Greenville, S. C., base hospital, Lieut. J. N. DOYLE, Princeton.

To Camp Sherman, Chillicothe, Ohio, base hospital, Lieut. A. J. WEBER, Milwaukee.

To Fort Oglethorpe for instruction, Lieuts. L. A. HOFFMAN, Campbellsport; P. C. HODGES, Madison; W. G. SEXTON, Marshfield.

To Fort Riley for instruction, Capt. H. A. Jefferson, Clintonville; Lieuts. H. J. CRAMBLING, Milwaukee; C. A. HEFTY, New Clarus.

To Fort Sam Houston, Tex., for duty, from Fort Riley, Lieut C. H. OLIVER, Boyerville.

To Madison University, Wis., for duty, Major J. A. E. RYSTER, Madison.

To Plattsburg Barracks, N. Y., for duty, from Fort Slocum, Capt. S. BLANTON, Madison.

To Rochester, Minn., Mayo Clinic, for instruction and on completion *to Camp Dodge*, Des Moines, Iowa, base hospital, Capt. E. L. MASEN, Eau Clair.

The following order has been revoked: *To Camp Meade*, Admiral, Md., base hospital, from Camp Crane, Lieut. C. B. RYDELL, Superior.

Wyoming

To Fort Riley, base hospital, Capt. G. A. FOX, Cheyenne. For instruction, Capt. M. A. NEWELL, Sheridan.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

College Suspended.—The College of Physicians and Surgeons of San Francisco has discontinued the teaching of medicine, but will retain a nominal existence for the next three years so as to grant diplomas to such students as shall complete their work satisfactorily in other medical schools.

FLORIDA

Appropriation for Venereal Disease Work.—The city council of Jacksonville, July 16, appropriated $5,000 to the health department for the work of combating the social evil in the city.

The Cleaning of Pensacola.—Dr. Fletcher L. Tatum, assistant health officer, West Florida, during the last three weeks in July inoculated 1,200 people of Pensacola against typhoid fever. Since May, Dr. Tatum has given 3,300 inoculations against typhoid. He has also inaugurated the cleaning up of the waste places of Pensacola.

Health Conference.—A conference of city health officers from Florida municipalities was held in Jacksonville, August 1 to 3, under the presidency of Dr. William H. Cox, city health officer. About forty were present, and among the principal topics of discussion were: the opportunities and obligations of a city health officer, legal procedure, the rights in health work, the methods and needs for keeping correct statistical records, malarial work as a public health measure, soil pollution work, and the venereal disease problem and its relation to public health.

Personal.—Dr. Henry O. Snow, Tampa, has been appointed head of the bureau of venereal diseases for the state of Florida. This assignment carries with it the appointment as acting assistant surgeon, U. S. P. H. S. Dr. Snow will establish clinics in Tallahassee and other cities of Florida for the treatment and control of venereal diseases.——Dr. H. Mason Smith, superintendent of the Florida Hospital for the Insane, Chattahoochee, has resigned to accept a commission in the United States service and has been succeeded by Dr. William M. Bevis, formerly assistant superintendent of the institution.

ILLINOIS

Licenses Revoked.—At a meeting of the Illinois Department of Registration and Education, held August 19, according to report, the licenses of the five following physicians were revoked: William Lewis LeBoy and James Russell Price of Chicago, Samuel Ringgold Harwood of East St. Louis, Edward E. Rohrabaugh of Hanna City and William L. Owen. The last named is at present serving a term in the Federal Prison at Atlanta, Ga., for illegally prescribing narcotics. Since his conviction in New York his licenses in New York, Pennsylvania, California and now in Illinois have been successively revoked.

INDIANA

Sanatorium Enlarged.—Sunnyside Sanitarium, near Oaklandon, is to be enlarged by a at least sixty-five beds for tuberculous patients. Sixty-five soldiers have been returned to Marion County from training camps throughout the country and more than 5,000 cases of the disease are known to exist in the county. Every effort will be made by the Marion County Society for the Prevention of Tuberculosis to care for these people.

Personal.—Dr. Davis L. Field, Jeffersonville, has been appointed physician at the Indiana Infirmary.——Dr. Cyrus A. Gardner, Kendallville, has been appointed local physician for the Fort Wayne and Northwestern Railroad succeeding Dr. Harold O. Williams.——Dr. John C. Sharrer, Francesville, while driving over a grade crossing at Galien, Mich., July 30, was struck by a Michigan Central train, his automobile was destroyed and he was thrown a distance of more than 100 feet, and on account of the serious nature of his injuries was taken to Mercy Hospital, Benton Harbor.

LOUISIANA

State Board Report.—The biennial report of the Louisiana State Board of Health for 1916-1917, made by Dr. Oscar Dowling, Shreveport, president, March 30, calls attention to the imperative need for the further inspection of important activities, such as the statistics of births, deaths and reportable diseases, the sales of caskets, the control of tuberculosis and other preventable diseases, and the venereal peril. The records of typhoid fever for 1917 show a slight increase over the previous year—due possibly to the greater return of certificates during the latter period—and an increasing demand for antityphoid inoculation. The report also details the excellent results of the extensive community campaigns which were introduced in the state through the help of the Rockefeller Sanitary Commission and the International Health Board. The principal recommendations of Dr. Dowling are that adequate funds be provided, a minimum of 12½ cents per capita, to operate more effectively the thirteen bureaus of general administration, food and drugs, laboratories, finances, vital statistics, child hygiene, public education, preventable diseases, venereal diseases, tuberculosis, sanitary inspection, sanitary engineering and oil inspection; that the service be placed on a merit basis with tenure of office dependent on efficiency; that the state be divided into health districts, preferably eight, with a whole-time officer as director of each appointed by the state board of health, this work requiring the appropriation of $30,000; that the model law be enforced; that persons suffering from communicable diseases, be isolated; and that more generous appropriations be made for hospitals for the insane and for the state tuberculosis sanatoriums. For this and the other work of the board an appropriation of $274,074.96 is asked. The report is illustrated and contains morbidity and mortality tables, and reports, also in tabular form, of the sanitary inspections undertaken by the board during the biennium.

MARYLAND

Outbreak of Typhoid.—There have been eighteen or twenty cases of typhoid fever in the upper part of Anne Arundel County during the past week, due to infected milk. It seems that a workman in a dairy serving the community was ill of typhoid, but his case was diagnosed as malaria. His daughter, who also was ill, was thought by her physician to have been suffering from malaria.

Personal.—Dr. George Edward Lancaster, Baltimore, formerly resident physician at the Dr. Lewis H. Gundry Sanatorium, Relay, has been sent to Fort Slocum, N. Y., for duty.——Dr. Harry H. Johnson, Baltimore, superintendent of Sydenham Hospital, has resigned and expects to leave immediately for Fort Oglethorpe, Ga.——William Drew has been promoted to the position of superintendent of pasteurization in the health department of Baltimore, succeeding Charles McLaughlin, resigned.

Morgue Overcrowded.—Owing to the overcrowded condition of the Baltimore morgue by deaths from heat, Health Commissioner John D. Blake reported to Mayor Preston that he feared an ice famine would seriously interfere with the successful operation of the temporary morgue on President Street. It is not equipped with a cold storage plant and has facilities for only seven bodies. Dr. Blake recommended the erection of a modern plant, with a room for the use of coroners, facilities for seventy-five or 100 bodies, and a room equipped for making necropsies.

New Home for Soldiers.—Through the kindness of Dr. Howard A. Kelly, 160 acres of ground has been set aside on the Severn River as a convalescent camp for soldiers. This camp has been named Camp Purnell, in honor of Colonel Purnell of Fort McHenry. The sick and wounded soldiers from overseas who are brought to this district and placed at Fort McHenry, will, when convalescent, be sent to this spot to regain health and strength. Camp Purnell will likewise be opened to convalescents from all army and naval camps and stations in this section who pass through the wards at Fort McHenry.

MASSACHUSETTS

Personal.—Dr. John F. O'Brien, Boston, has been appointed chairman of the board of trustees of the Municipal Consumptives' Hospital.——Dr. Marion Shepard, Northampton, has been appointed associate professor of physical education and medical adviser of women in the University of Pittsburgh, and will assume the duties of her new position in September.——Dr. Herbert F. Gammons, Boston, has been appointed assistant medical directer of the Minnesota State Advisory Committee and will take charge of the Deerwood Tuberculosis Sanatorium.——Dr. Merrill E. Champion, Wollaston, state district health officer, has been appointed director of the division of hygiene of the state department of health.

NEW YORK

State Laboratory Association.—The second annual meeting of the State Association of the Public Health Association was held recently and the following officers were elected: president, Dr. Warren B. Stone, Schenectady; vice president, Dr. J. S. Lawrence, and secretary-treasurer, Dr. Howard I. Davenport, Auburn.

Personal.—Dr. James B. Conant, Amsterdam, who has been under treatment at the Amsterdam Hospital since August 2 on account of an infected wound of the finger, is reported to be canvalescent.——Dr. Franklin C. Gram, health commissioner of Buffalo, recently celebrated the twenty-fifth birthday of his connection with the staff of the health department.——Dr. Joseph C. Palmer, health director of the public schools in Syracuse, expects to sail for Italy this month as a member of the American Commission on Tuberculosis in Italy.——Dr. Mary E. Walker, Oswego, is reported to be dangerously ill at her home.——Dr. M. D. Dickinson has been appointed health officer of Troy, succeeding Dr. Calvin E. Nichols, who has resigned after holding the position for eighteen years.

New York City

Nurses' Training Schools Opened.—A nurses' training school is to be opened in September as an adjunct of the United States Base Hospital No. 1, The Bronx, and another in connection with the United States Debarkation Hospital at Fox Hills, Staten Island. These are the second and third nurses' training schools to be established in connection with base hospitals in this country. The first was opened at Spartanburg.

Personal.—Dr. David Hershfield was seriously injured in an automobile accident at Montrose, and is under treatment at the Peekshill Hospital.——Major Edward W. Lee, M. C., U. S. Army, who is on duty in Porto Rico, is reported to be seriously ill with typhoid fever.——Lieut. M. Philip Cowett,

house physician at Bellevue Hospital from 1915 to 1917, has been awarded the *Croix de Guerre* by the French government for gallantry in battle.——Dr. Frank J. Monaghan of Brooklyn has been appointed acting deputy commissioner in charge in Brooklyn.

Course for Laboratory Aids.—New York University and Bellevue Hospital Medical College have arranged a special three months' course for those who wish to qualify as laboratory assistants in bacteriologic work for immediate service in camps and hospitals. The Surgeon-General's Office has issued a call for those assistants. The course is arranged by Dr. William H. Park, director of laboratories for the health department, and Dr. Anna W. Williams, assistant director. It will open September 4. The fee is $75; a few scholarships may be available. Preference will be given to college women with some preliminary training. Applications may be made to Dr. Park at the New York Department of Health.

Yonkers Convalescent Home for Government.—Construction work is to be started in a few weeks on the convalescent home for which provision was made in the will of Mrs. Caroline Neustadter. Mrs. Neustadter bequeathed $1,000,000 for this purpose, of which $250,000 is to be used in the construction of buildings, and the income from the remainder is to be used for maintenance. The trustees announce their intention of offering the institution to the government when it is completed and fully equipped to be used as a hospital for officers. The plans provide accommodations for seventy-five patients, but it will be possible to care for a much larger number.

Influenza Arrives in New York.—Two steamships, one from Norway and one from another Scandinavian port, arrived in New York, August 14 and 15, having on board a number of cases of so-called Spanish influenza. The ships were not held up at quarantine, as influenza is not a quarantinable disease and such a procedure would interfere to too great an extent with shipping to be adopted with any affection other than those diseases generally recognized as proper diseases against which to declare marine quarantine. The United States Public Health Service has received full reports of the presence of Spanish influenza in New York but will take no steps to establish a quarantine against the disease. The New York Department of Health, following a conference on the subject, has inaugurated a campaign against influenza and all similar diseases. Every ship which brings a case of influenza will be registered with the board of health and the health inspectors will obtain from the immigration authorities the destination of the cases reported.

NORTH CAROLINA

Typhoid.—There are said to be sixteen cases of typhoid fever in Forsyth County, eleven in Broad Bay Township. This epidemic is attributable to bad sanitary conditions, mainly, open unsanitary privies.——A typhoid epidemic is reported among the German sailors and civilians at the Internment Camp, Hot Springs, where it is said there have been 150 cases with eleven deaths. Shallow wells are said to be responsible for the infection.——During the three weeks in July there were 220 cases of typhoid fever reported, bringing the total for the first three weeks of the month up to 596 cases. The state board of health is furnishing typhoid vaccine free to all who apply for it. Mecklenburg County leads the state in the number of cases of typhoid.

Failure to Report Disease.—During the past month more than twenty physicians have been prosecuted for violations of the state quarantine laws in failing to report communicable disease. The requirements of the law are plainly stated in the act itself, and every practitioner has had placed in his hands copies of the statute during the last year, and every effort has been made by the authorities to secure reports without presenting physicians to the courts. The importance of the subject in relation to the draftees from every community reporting to the various mobilization camps throughout the nation renders more imperative than usual the enforcement of the laws requiring the reporting of all contagious and infectious disorders. The fines assessed were very nominal for first offenses, totaling in twenty-one cases $59.01, but it is understood the trial judges have announced their intention to make second or later convictions yield much larger sums for the school funds which receive the income from fines in criminal cases in this state. The net cost of the prosecution of the cases was $320.

PENNSYLVANIA

Course in Public Health Nursing.—Beginning October 1, the Carnegie Institute of Technology announces that a four-year course in public health nursing will be opened by the general science department at the Margaret Morrison Carnegie School. The schedule of studies includes English, physics, chemistry, biology, physiology, foods, hygiene and physical training in the freshman year; microbiology, sanitary science, public health, industrial hygiene, public health nursing, dietetics and social work in the sophomore year, and theoreical and practical instructions in nursing for those who satisfactorily finish the first two years' work, in the junior and senior years. The graduates may be expected to find employment in school inspection, factory and industrial, public health and welfare work.

Philadelphia

Personal.—Dr. Robert Howland Chase has resigned as medical superintendent of the Friends' Hospital, Frankford (Frankford Insane Asylum), after a service there of twenty-five years. Dr. Albert C. Buckley, who became assistant at the Friends' Hospital in 1906 and who was promoted to clinical director two years ago, has been made medical superintendent to succeed Dr. Chase.

Campaign Against Tuberculosis.—Plans have been completed for a campaign of education among negroes in Philadelphia to check the spread of tuberculosis. The work will be under the direction of physicians and nurses in cooperation with the Philadelphia Tuberculosis Committee. The campaign was opened with a mass meeting at the McCoach Playground, Catherine and Seventeenth Streets. The members of the committee in charge of the work are: Isadore Martin, Dr. T. Spotuas Burwell, A. L. Manley, Mrs. A. W. Blackwell and Dr. Algernon B. Jackson.

SOUTH CAROLINA

Hospital Items.—The board of governors of the Greenville City Hospital, finance committee of the city council and the mayor of Greenville held a conference, July 29, and decided that the work on the new hospital building be started at once. The building will cost $130,000, will be an addition to the present structure, will be three stories in height, practically fireproof, and will contain about forty rooms for the accommodation of patients.——The Union Hospital, Union, was incorported, July 18, with a capital stock of $1,800.

SOUTH DAKOTA

Reorganization Meeting.—The Third District Medical Society, which was divided at the last state meeting, held at Mitchell in May, met for the purpose of reorganization, at the Lake Madison Chautauqua Grounds, July 31, under the presidency of Dr. Burtis T. Green, Brookings. Dr. John C. Baker, Ramona, is secretary of the association which includes the counties of Beedle, Kingsbury, Brookings, Miner and Lake.

Personal.—A farewell dinner was given at Sioux Falls to Capt. William F. Keller and Lieut. D. Willard Craig, who have entered the military service. The mayor presided as toastmaster. Captain Keller was for twelve years city health officer.——Dr. William M. Housman, Dell Rapids, was seriously injured by the overturning of his automobile, near Dell Rapids, July 9. His injuries consist of a punctured right lung, three fractured ribs, and a number of contusions about the head and body.

UTAH

Personal.—Dr. Ephraim G. Hughes, consulting surgeon of the State Memorial Hospital, Provo, has resigned.——Dr. Edwin M. Neher, Price, chairman of the local medical advisory board who is leaving the state, was the guest of honor at a dinner, July 31.——Dr. Ephraim G. Gowans, Salt Lake City, was elected chairman of the child welfare committee of the State Council of Defense at its meeting, August 2.

WISCONSIN

Quarantine for Infantile Paralysis.—Platteville has been quarantined on account of the presence of infantile paralysis in the city. Children under 16 years of age are forbidden to leave their home premises, and no children are permitted to leave or enter the city until notification by the authorities.

Site for Wolcott Statue Selected.—The bronze equestrian statue of Dr. Erazmus B. Wolcott, for the erection of which his widow provided $31,500 in her will, is to be erected in Lake Park, Milwaukee, near the concrete bridge on the lake

drive. Dr. Wolcott was a pioneer resident of Milwaukee, and surgeon-general of the state during the Civil War.

Personal.—Dr. Herbert L. Wright, for three years health commissioner of Kenosha, has resigned to accept a similar position at Lansing, Mich.——Fond du Lac County Medical Society tendered a supper, July 30, to Drs. Frederick M. Harris, Fond du Lac, and John M. A. Baasen, North Calvary, who are ordered to duty at New Haven, Conn., and Fort Riley, Kan., respectively.

Health Conference.—The fourth biennial conference of health officers of Wisconsin was held in Madison, August 7 and 8. Among the more important subjects discussed were serum and vaccines, public health work, the guarding of health in war times, water supplies and sewage disposals, summer resort sanitation, industrial waste problems, institutional treatment for venereal disease control, open air schools, nuisances and their control by the local health officer, health officers who are not physicians, health work in townships and laboratory service of the state, necessary activities of boards of health, the power to enforce quarantine, how and where a city or village can be in a sanitary condition, and the control of infantile paralysis.

CANADA

Public Health Notes.—Dr. Charles J. C. O. Hastings, M.O.H., Toronto, is asking the board of health of that city to undertake a survey of citizens to ascertain the prevalence of tuberculosis in Toronto, and to see if present methods of control are adequate and if the money is being spent to the best advantage. Nine years ago there were six institutions in Canada caring for the tuberculous. The accommodation was then 350 beds; now it is about 3,000 beds. It cost about $150,000 nine years ago to maintain those institutions, whereas at the present time about $900,000 is spent on maintenance, apart from that spent by the Soldiers' Aid Commission. Three million dollars have been spent in plants in Canada which is considerably less than that spent on ordinary hospitals with similar accommodation.

Hospital News.—A new hospital is being built at Kannaskis, near Banff, Alta. It is to cost $400,000, of which the Dominion government and the Province of Alberta will each pay one half, and will accommodate 300 patients.——The Saskatchewan Hospital Unit is now stationed in Lorraine, France.——Winnipeg General Hospital is asking the city for $60,000 to meet urgent expenses.——The wards in the Isolation Hospital, Toronto, are no longer free. Rates in the public wards are $1.25 a day; semiprivate, $2, and private wards, $3.——The revenue of the Winnipeg General Hospital last year was $417,292, and the expenditures, $476,507. There were 4,387 general operations, and 22,130 in the roentgen-ray and the hydrotherapeutic departments.——The MacLaughlin Companies, Oshawa, Ont., have donated a maternity hospital to the town. It is called the Llewellyn Maternity Hospital.

GENERAL

Dairy Food Convention.—The twenty-second annual convention of the Association of American Dairy Food and Drug Officials will be held in Chicago, August 27 to 30. The principal sessions will be held at the Congress Hotel, and the chief subjects for discussion will be the safeguarding of the country's food supply, food scarcity, high prices, and the temptation offered to unscrupulous dealers and manufacturers to place on the market unhealthful substitutes and inferior products.

Five Conferences on Tuberculosis.—The National Tuberculosis Association announces that it has plans under way for five conferences covering the country in geographic sections to consider practical measures for coping with tuberculosis as a war problem. The questions discussed will be means of providing adequate care for the thousands of soldiers and sailors already discharged from the Army and Navy on account of tuberculosis, and the still greater number rejected in the draft for the same reason, and also the question of educating the civilian population more fully regarding tuberculosis during the war and thus combating its further spread in the community. The conferences are to be held as follows: Spokane, Wash., September 27-28; Denver, October 2-4; Birmingham, Ala., October 11-12; Pittsburgh, October 17-18; Providence, R. I., October 25-26. The association is making efforts to have the attendance at these conferences as large as possible. All health officers, dispensary physicians, visiting nurses and others interested in the problem of tuberculosis are urged to attend.

FOREIGN

Deaths in the Profession Abroad.—Dr. **A. Key-Aberg,** professor of legal medicine at the University of Stockholm, and the only regular professor of this branch of science in Sweden, which he taught in connection with pathologic anatomy. He had published important works on sudden death from arteriosclerosis, child murder, etc.——The *Hospitalstidende* mentions the death of **M. Wilms,** the successor of Trendelenburg in the chair of surgery at Leipzig and later of Czerny at Heidelberg, aged 50.

Oil from Marshes.—The *Nederlandsch Tijdschrift* states that R. Francé, the biologist, living in Munich, has succeeded in expressing the oil from the cells of a low organism which lives in stagnant waters. The oil is said to have a melting point of 40 C., and the chemist Buchner affirms that it is the equal at least of coco oil. It is estimated that 100,000 kg. of good oil can be obtained per month in this way, and ichthyol, silicium and a nitrogenous fertilizer can be obtained from the waste.

Sanatorium and Hospital for Refugee Children.—A villa at Posillipo has been fitted up for a hospital and sanatorium for the refugee children in the province of Naples. It is in charge of Prof. G. Tropeano, and provisions have been made for ten pavilions. One, for observation, has 25 beds, the eye pavilion has 40 beds, the surgical 80, the skin diseases pavilion 40, the gastro-intestinal 100 beds and the diseases of the chest 80 beds. There is a station for heliotherapy, equipped with 100 beds, and a seacoast station, in connection, with 200 beds. At present 250 children are housed in the institution and others in the annexed stations.

School for Training in Infant Welfare Work.—The commencement exercises of the Ecole de puériculture at Bordeaux, France, recently graduated thirty-seven women who had completed the course. The school trains for positions as superintendents, assistants, visitors, inspectors and other positions in the general system of welfare work for young children, such as day nurseries, milk stations, nursing consultations and quarters where mothers working in factories can leave their children and come to nurse them. The school plans further to train in mothercraft, mothers, young girls, nurse girls and others. The school is under the patronage of the Union des femmes de France.

Extra Rations for the Sick in Norway.—In both Denmark and Norway, the sick are able to obtain extra rations on a medical certificate. In Norway the matter has been simplified by having a list of the different foods in question printed on the ration card, and the physician has merely to inscribe the quantity. The physicians have already been informed by a circular from the government for what diseases certain food can be allowed in extra ration. On the ration card he has merely to state that the disease is acute or chronic. For chronic disease the certificate is good for twelve weeks; for acute, merely during the period he specifies. All the certificates are to be examined to protect against abuses, to prevent one person getting certificates from several physicians, or one physician being too prodigal in giving out certificates. The authorities also will seek to prevent a person's getting extra rations under different claims for different diseases.

SOUTH AND CENTRAL AMERICA, MEXICO AND WEST INDIES

Annual Meeting of Brazilian Neurologists and Psychiatrists.—The date, November 3, has been appointed for the second Congreso Brazileiro de Neurologia, Psychiatria e Medicina Legal, which is to convene at São Paulo this fall. Prof. F. da Rocha of S. Paulo is to preside; Dr. E. Vampré is the secretary.

Peru to Have a Sanatorium for the Tuberculous.—Our Lima exchanges give the details of the first antituberculosis sanatorium to be constructed in Peru, for which plans are now being made by the Sociedad de Beneficencia of Lima, a sum of about $50,000 having been bequeathed to the society for the purpose some years ago. A sanatorium with pavillions for paying and for charity patients is planned, and it is proposed to locate it near the city of Jauja as suggested by the testator. This site is not regarded by the commission in charge of the matter as particularly well chosen. As natural drainage is out of the question, the septic tank system is to be installed. The water supply will be by wells. The buildings now planned will cost considerably more than twice the amount of the bequest, so that only the free pavillions are to be erected at first.

BUENOS AIRES LETTER

Buenos Aires, July 9, 1918.

South American Conference on Hygiene, Microbiology and Pathology

The second biennial reunion of those interested in these branches of science is to be held at Rio de Janeiro, October 15 of the current year, according to the announcement of the committee of organization. The first conference of the kind convened at Buenos Aires in September, 1916, and a volume of the transactions has been published. All the countries in South America have been invited to the approaching meeting.

Conferring of Degrees and Prizes

The medical faculty of the university here at the annual exercises conferred degrees and awarded the following prizes: The Faculty prize for the best thesis was given to Dr. A. Gutierrez, a 1916 *ex-alumno*, for his thesis on the topographic anatomy of the peritoneum; the E. Wilde prize for the best thesis on legal medicine was awarded to Dr. O. Loudet, a 1916 *ex-alumno*, for his thesis on "Passion in Crime." The prize for the best work published in the country was conferred on Dr. P. Escalada for his work on radium therapy, entitled "Curoterapia." The gold medal awarded by the school of pharmacy was given to señorita Lola Pastorelli, and *diplomas de honor* were given to A. Arnaboldi, Sara L. Irigoyen, Maria Deco and Alberto Dondiz. The recipients of the gold medal awarded by the school of odontology were the *ex-alumnos* L. T. Larequi and J. P. Icart, with a *diploma de honor* given to M. P. Meurville. The school of obstetrics conferred *diplomas de honor* on Margarita D'Abbondio, Juana de Franco and Elisa B. de Rodriguez.

The gold medal awarded by the medical school for the 1916 course was given to Dr. O. M. Pico, and *diplomas de honor* were given to Drs. A. J. Vitale, C. A. Correas, R. B. Moron, Virginia Peradotto, A. Astiz, Sara Satanowsky, J. L. Celazco, E. Icasati and D. B. Brian.

The Campaign Against Cancer

Dr. Angel H. Roffo, who has specialized in experimental research on cancer, delivered a lecture, July 1, at the Instituto Popular on the anticancer campaign. He described his own extensive and prolonged investigations on the transplantation of tumors of white rats, and his attempts at chemotherapy, commenting on the scanty local initiative devoted to this object. The Academia de Medicina began the construction of an institute for cancer research, with a small hospital annexed, but its construction has been suspended. The Departamento Nacional de Higiene maintains a cancer section, in charge of Roffo, in the Instituto Nacional de Bacteriologia.

LONDON LETTER

London, July 16, 1918.

Trinitrotoluene Poisoning

The report of the factory inspectors on trinitrotoluene has just been issued. The investigations into this form of poisoning made during the war have resulted in a gratifying decrease in the number of cases. A remarkable feature of the disease is the length of time that may elapse between absorption of the poison and the development of jaundice or anemia. The most extreme case reported was that of a woman, who, after two months' work in processes in the manufacture of trinitrotoluene, was transferred to another department. Over seven months later a spanner fell on her head. Toxic jaundice developed a week later, and proved fatal in a fortnight. Skin absorption of trinitrotoluene is a difficult condition to overcome. Gloves were provided and worn by the million, but they never adequately protected the skin, and eventually were regarded more as a source of danger than a safeguard, and their use given up. It was the same also with the continuous wearing of respirators, which has proved an impracticable remedy; but it is not so, fortunately, with regard to exhaust ventilation locally applied.

Dearth of Drugs

At the annual meeting of the British Pharmaceutical Society, the president, Mr. C. A. Hill, dealt with the supply of drugs in war time. In some instances, he said, stocks are becoming dangerously low—in fact, approaching exhaustion—and are not replaceable without government assistance. Among the drugs referred to were: Asafetida: Almost a famine prevails in this article, as with most others from the Persian Gulf. Calumba root: There is at present a famine in this drug, and anything available would fetch more than twelve times the prewar price. Cascara sagrada: Stocks have steadily diminished, and the price is steadily advancing. Ergot: Little is coming in from Russia, and the market is now dependent on Spain and Portugal. Galbanum: This is now unobtainable. Liquorice root: The present price is fourteen times as great as the prewar price, and the quality is much inferior. Balsam of Tolu: The shipping difficulty is answerable for the scarcity. Benzoin: Every parcel which arrives realizes extravagant prices. Buchu leaves: The prices realized are exorbitant. Jalap: Owing to the scarcity, prices have quadrupled since the war. Sarsaparilla: Owing to its bulky nature, shipping space can seldom be secured. Turmeric: The market is bare of all grades. The following drugs from enemy countries are quite unobtainable: storax, hellebore, Austrian stramonium, uva urst, scammony, Turkish opium, Turkish tragacanth and Bulgarian attar of roses. Fortunately, the cultivation of certain drugs in this country has furnished adequate supplies; these drugs are colchicum, digitalis, poppy heads, belladonna and henbane. Referring to the scarcity of saccharin, the president said that as the article was controlled by the government there was no safety valve such as would be provided by the law of supply and demand in the form of an increased price. The reply given by the French government to the British government in answer to an inquiry regarding the reasons which had led to the ban on saccharin foodstuffs in France was to the effect that where sugar entered into an article for other than mere sweetening purposes it was not considered desirable in the public interest that it should be omitted and its place taken by some less useful substitute, plus the small quantity of saccharin necessary for sweetening.

American Hospitals in England

The accommodation for American wounded in England is constantly increasing. Near Southampton, Sarisbury Court, a military hospital for nearly 3,000 men is being erected. The old Manor House will be the center of 10 acres of huts. The old vegetable garden will be intensively cultivated so as largely to supply the hospital. The ambulances which meet the hospital ships will carry the wounded to a very pleasant estate. In London the Army Council has arranged to take over the southern and northeastern hospitals of the Metropolitan Asylums Board for Americans. In Portsmouth the corporation has agreed to hand over the local mental hospital for the same purpose.

PARIS LETTER

Paris, July 11,, 1918.

Death of Professor Grasset

Dr. Joseph Grasset, honorary professor in the Montpellier Medical Faculty, has recently died, aged 69. Grasset was born in Montpellier in 1849, studied, worked and died there. He was a hospital intern in 1871, assistant in therapeutics in 1875, and professor in 1881. In 1886 he assumed the chair of clinical medicine which he held for the remainder of his active life as a teacher. Grasset early began to specialize in diseases of the nervous system. In 1878, he published his "Traité pratique des maladies du système nerveux," which went through four editions (the fourth in collaboration with Professor Rauzier appeared in 1894). Later he took up the study of psychology, normal and morbid. In 1904 he published a study, "Spiritisme devant la science"; in 1908, "L'Occultisme hier et aujourd'hui" (translated into English). He also published a series of works on the responsibility of criminals, notably a book entitled "Demi-fous et Demi-responsables," (also translated into English). During the later years of his professorial work he taught pathology and general therapeutics, and published two voluminous treatises, "Physiopathologie clinique" in three volumes (1910-1912) and on "Thérapeutique générale" in two volumes (1913-1914). Professor Grasset was national associate of the Académie de médecine since 1898.

Ear Disturbances of Military Aviators

Dr. A. Castex recently reported the results of his examination of aviators at the military hospital at Villemin, at Paris and at the *Centre d'aviation* at Borget. During the ascent the disturbances of which the aviator may be the victim are characteristic of a general fatigue due to the rapid fall of atmospheric pressure. In full flight, at a height of about 5,000 meters, he suffers from pain in the ears, fulness of the head, somnolence and apathy. During the descent, there is again pain and buzzing in the ears, which cease as

soon as the aviator makes a landing. Finally, after landing, he may have transitory deafness and sometimes a reeling gait. Otoscopy showed that during the descent a congestion of all the auditory apparatus is produced.

In some aviators a progressive diminution of labyrinthine perception is noted. At times, latent disturbances in the superior respiratory tract may be adjuvant causes of the deafness (tubotympanic catarrh, the beginning of an otosclerosis, hypertrophic rhinitis, malformation of the septum, adenoids and enlarged tonsils). Most of these disturbances are due to the changes in atmospheric pressure, caused by the differences in air pressure, from which the aviators will be relieved if, during the ascent, they will make use of Valsalva's experiment and during the descent, of Toynbee's.

Factitious Mumps

Drc. F. Trémollières and L. Caussade called the attention of the Société médicale des hôpitaux de Paris to a little known method of simulating mumps which they had occasion to witness among the soldiers of a regiment of Moroccan tirailleurs. In order to produce a swelling in the parotid region the soldier inflated his cheeks forcibly by pinching his nares and placing his hand over his mouth.

Obligatory Revaccination of Public Officials

A decree has been issued by the minister of the interior which makes it obligatory on all persons—whatever the age—who are attached to the permanent, temporary or auxiliary personnel of the administration of the state, and of all the subordinate services, to be vaccinated or revaccinated if they cannot, within ten days at the latest, furnish a medical certificate stating that they had been vaccinated successfully within the preceding five years. Infraction of this decree is punishable by a fine, without prejudice of the *sanction disciplinaires.*

Prize Awarded by the Academy of Sciences

Among the prizes offered by the Academy of Sciences is the Montyon prize, consisting of 2,500 francs. This prize has been awarded to Drs. Henri Guillemard and André Labat, of the Medical Faculty of Paris, for their research work on asphyxiating gases.

Death of Dr. Bonnaire

Dr. E. Bonnaire, a member of the medical faculty of Paris and obstetrician to the hospitals, died at the age of 60 years from a malady contracted on a tour of inspection of the *pouponnières d'usines de guerre* (arrangements for children whose mothers are working in war factories).

Personal

At the meeting of July 30, the Académie de médecine elected a vice president for 1918 to succeed the late Professor Pozzi. Dr. Delorme, médecin inspecteur général of the Service de Santé militaire and director of the Ecole d'application de médecine et de pharmacie militaires of Val-de-Grâce, was elected to this office. Conforming to the regulations of the Academy, the vice president succeeds to the presidency the following year.

Marriages

CAPT. ALFRED ISADOR LOWENTHAL, M. R. C., U. S. Army, New York City, on duty with the U. S. Base Hospital at Edgewood, Md., to Miss Dora Bernice Bryfogle of East Akron, N. Y., August 6.

LIEUT. EMMETT CHARLES SCHOOLFIELD, M. R. C., U. S. Army, Cleveland, on duty in Denton, Texas, to Miss Blanche M. Featherstone, also of Cleveland, recently.

LIEUT. JOHN JOSEPH MCDERMOTT, M. R. C., U. S. Army, Patchogue, L. I., N. Y., to Miss Margaret Louise Feiner, at Ann Arbor, Mich., August 14.

FRANCIS MANLY STUMP, San Bernardino, Calif., to Miss Edith Helen Miller of Loma Linda, Calif., June 30.

WILLIAM LEIGH WILLIAMSON, Bayonne, N. J., to Miss Mary T. O'Neill of West Hoboken, N. J., August 15.

JAMES CLAUDE KESSLER, Iowa City, Iowa, to Miss Laura Ethel Sayre of St. Charles, Iowa, June 27.

CHARLES HENRY PEETE to Miss Lucy Pettway Jones, both of Warrenton, N. C., July 3

Deaths

Luther Halsey Gulick, New York City; New York University, New York City, 1889; aged 52; an associate Fellow of the American Medical Association; for many years physical director of Y. M. C. A., in Michigan and Massachusetts and in the public schools of New York City; editor of *Physical Education,* from 1891 to 1896; of the *Association Outlook,* from 1897 to 1900; of the *Physical Education Review,* from 1901 to 1903, and of the *Gulick Hygiene Series;* a member of the Olympic Games Committee in 1906 and 1908; consultant to the New York Hospital for Deformities and Joint Diseases; president of the American Physical Association, from 1903 to 1906; of the Public Physical Training Society, from 1905 to 1908; and of the Playground Association of America from 1906 to 1909; an authority on physical training and author of many books and monographs on the subject; died at his summer home in South Casco, Maine, August 13.

William Houston Greene, Philadelphia, Jefferson Medical College, 1873; aged 64; a Fellow of the American Medical Association; assistant professor of chemistry from 1870 to 1877; and demonstrator of chemistry from 1875 to 1877 in his alma mater; demonstrator of chemistry in the University of Pennsylvania, from 1879 to 1880; professor of chemistry of the Central High School, Philadelphia, from 1880 to 1892; author of many works on chemistry and American editor of Paul Berts' First Steps in Scientific Knowledge; a chemist of international repute; died in his summer home, Wenonha, N. J., August 8, from heart disease.

Frederick Lyman Hills, Pittsford, Vt.; College of Physicians and Surgeons in the City of New York, 1892; aged 47; a Fellow of the American Medical Association, and a member of the American Medico-Psychological Association; and National Association for the Study and Prevention of Tuberculosis; who was appointed first assistant to the New Hampshire Hospital, Concord, N. H., in 1897, and was later one of the commission to select this site for the State Sanatorium, and later in 1907 became superintendent of the State Sanatorium, Rutland, Mass., and in 1910 of the Maine State Hospital, Bangor; died in New York City, July 29, from pneumonia.

Jacob H. Gallinger, Concord, N. H.; New York Homeopathic Medical College, 1868; aged 81; a practitioner of Concord from 1862 to 1865; surgeon-general of the state with rank of brigadier-general in 1879 and 1880; a member of the state legislature from 1872 to 1873, and in 1891; state senator from 1878 to 1880 and during the last two years president of the senate; a member of the forty-ninth and fiftieth Congresses and United States Senator from New Hampshire since 1891; died in the Franklin (N. H.) Hospital, August 17, from arteriosclerosis.

William Phillip Mathews, Richmond, Va.; Medical College of Virginia, Richmond, 1890; aged 50; a Fellow of the American Medical Association; a member of the Southern Surgical and Gynecological Association; professor of anatomy and orthopedic surgery in his alma mater; orthopedic surgeon to the Old Dominion Hospital, Richmond; president of the Board of Health of Manchester, Va., during 1900 and 1901; died at his home, July 25.

Capt. Paul Eugene Betowski, M. R. C., U. S. Army, Waverly, N. Y., Long Island College Hospital, Brooklyn, 1907; aged 37; a Fellow of the American Medical Association; from 1912 to 1917 surgeon-in-chief of the New York State Soldiers and Sailors Home, Bath; attached to the Six Hundred and Sixty-Sixth Aero Squadron, American E. F., France; died, July 2, from injuries due to an automobile accident.

John Shields McGinness, Lock Haven, Pa.; University of Pennsylvania, Philadelphia, 1864; aged 77; assistant surgeon of the Two Hundred and Seventy-Seventh and One Hundred and Ninety-Ninth Pennsylvania Volunteer Infantry, and later surgeon of the One Hundredth New York Volunteer Infantry, and Thirty-Ninth Illinois Volunteer Infantry during the Civil War; died at his home, August 8, from heart disease.

Capt. John Carmichael, C. A. M. C., Collingwood, Ont.; Queens University, Kingston, Ont., 1915; aged 29; who had been in France for nearly two years, and was attached to No. 8 Canadian Field Ambulance; while on duty at an advanced dressing station, and returning from a visit to the regimental aid post of one of the battalions in the trenches, April 4, was wounded and died eight hours later.

Frederick Nelson Tannar, Baltimore; Maryland Medical College, Baltimore, 1900; aged 43; professor of pediatrics

and medical jurisprudence in his alma mater; attending physician to the Franklin Square Hospital, and Robert Garrett Hospital for Children; died at the Church Home and Infirmary, Baltimore, August 5, after a surgical operation for disease of the intestine.

Helen Crittenden, Evanston, Ill.; Northwestern University Woman's Medical School, Chicago, 1894; organizer and director until her death of the Social Service Registration Bureau of the Chicago Bureau of Charities; president of the Social Service Club in 1913, and a lecturer in the Chicago School of Civics and Philanthropy; died at her home, August 15.

August H. Rickoff, Chamois, Mo.; St. Louis College of Physicians and Surgeons, 1893; aged 54; a member of the Missouri State Medical Association; coroner of Osage County; local surgeon for the Missouri Pacific System, and representative from Osage County in the forty-ninth General Assembly; died at his home, August 4, from cerebral hemorrhage.

Edgar John Leary, Sudbury, Ont.; University of Toronto, Ont., 1912; aged 31; who had seen two years' service in France as a medical student, and later was a member of the staff of the Mimico, Ont., Hospital for the Insane, and then entered the service of the Canadian Copper Company, was drowned in Meat Bird Lake, near Sudbury, Ont., August 8.

Samuel Frederick Anderson, Brooklyn; Long Island College Hospital, Brooklyn, 1890; aged 53; a member of the Medical Society of the State of New York; assistant laryngologist to the Methodist Episcopal Dispensary; died at his country home, Seaside Park, N. J., August 5, from acute gastritis.

Joseph Edward Ziliak, Evansville, Ind.; University of Michigan, Ann Arbor, 1898; aged 40; local surgeon to the Evansville and Terre Haute Railroad; for several years milk inspector of the city; died at St. Mary's Hospital, Evansville, July 16, a day after an operation for the relief of disease of the stomach.

Lieut. Francis Oral Vicars, M. R. C., U. S. Army, Livingston, Mont.; Chicago College of Medicine and Surgery, 1907; aged 38; was drowned by the overturning of his boat while crossing the Yellowstone River at Carter's Bridge, on his way to the Vicar's ranch, July 23.

Freeman R. Chaffee, Lucy, Tenn.; Memphis, Tenn., Hospital Medical College, 1904; aged 43; a Fellow of the American Medical Association; local surgeon for the Illinois Central System at Lucy; died at his home, August 2.

Lon Naylor, Hickman, Ky.; Louisville, Ky., Medical College, 1898; aged 42; a Fellow of the American Medical Association; and president of the Fulton County Medical Society; died in Denver, July 12, from tuberculosis.

Benjamin F. Green, Hickory, Ky.; St. Louis College of Physicians and Surgeons, 1889; aged 64; a member of the Kentucky State Medical Association; died at his home, near Hickory, July 11, from basilar meningitis.

William Henry Lawrence, Summit, N. J.; New York University, New York City, 1877; a member of the Medical Society of New Jersey; formerly sheriff of Union County, N. J., died at his home, August 5.

Judson Thomas Beall, Akron, Ohio; Starling Medical College, Columbus, Ohio, 1881; aged 60; a Fellow of the American Medical Association; died at his home, August 9, from cerebral hemorrhage.

Charles M. Taylor, Corinth, Miss.; Tulane University, New Orleans, 1892; aged 51; a Fellow of the American Medical Association; died in the Baptist Memorial Hospital, Memphis, Tenn., July 19.

Howard H. Dawson, Phoenix, Ariz.; Denver College of Medicine, 1890; aged 51; formerly local surgeon of the Rio Grande Southern Railroad, at Rico, Colo.; died at his home, August 9.

Frank Albert Crossman, Dorchester, Boston; New York University, New York City, 1882; aged 59; a member of the Massachusetts Medical Society; died at his home, August 5.

William S. Gass, Royal Oak, Mich.; Detroit College of Medicine and Surgery, 1899; aged 44; died at his home, July 30, from carcinoma of the tongue.

Kurre W. Ostram, Quakertown, Pa.; Royal University, Upsala, Sweden, 1888; aged 52; died at his home, March 20, from pneumonia.

John Swiney Amyx, Amsterdam, Mo.; Kansas City, Mo., Medical College, 1896; aged 54; died at his home, June 26.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

IODINIZED EMULSION (SCOTT) AND CREOSOTONIC (SCOTT)

Report of the Council on Pharmacy and Chemistry

"Iodinized Emulsion (Scott)" and "Creosotonic (Scott)" are proprietary preparations of the Dawson Pharmacal Company, Dawson Springs, Ky. The latter preparation used to be known as "Iodinized Emulsion (Scott) with Hypophosphites, Guaiacol and Creosote." In 1907 these preparations were considered by the Council and found inadmissible to New and Nonofficial Remedies. Examination of the preparations having been again requested, the Council considered them anew because the composition and claims had been changed somewhat and because at the previous consideration no report was published.

The reports which appear below were sent to the Dawson Pharmacal Company for comment before publication. In reply the company offered to revise its claims for the preparations. The Council replied that the report sent explained that both preparations are irrational mixtures, and hence a revision of the claims would not make them eligible for New and Nonofficial Remedies. It advised that publication of the report would be withheld sixty days and that it would be revised if new information or evidence was submitted permitting such revision. After expiration of the stipulated postponement, the Dawson Pharmacal Company wrote that no new advertising matter had been prepared but that the old circulars were not being sent out.

As these irrational preparations were still sold and advertised to the medical profession and presumably used by some physicians, the Council directed publication of its report with this explanation.

W. A. PUCKNER, Secretary.

Iodinized Emulsion (Scott)

The label for Iodinized Emulsion (Scott) declares:

"Each fluidram contains: Alcohol, m. 4¾; Rectified Ol. of Turpentine, m. 3½; Iodin, gr. ⅛; Phenol, gr. ½; Glycerine and Elixir Lactated Pepsin with Aromatic Oils in the form of a perfect emulsion."

A circular, which gives what is asserted to be the composition of Iodinized Emulsion, declares that, among other ingredients, each fluidram contains "one and three quarters m. Tincture of Iodine." Both the statement on the label that the preparation contains "iodin" and the one in the circular that tincture of iodin is present in the product are incorrect, for the A. M. A. Chemical Laboratory reports that no free iodin could be detected in the preparation, and that it responded to tests for iodid instead.

An advertising circular for Iodinized Emulsion (Scott) makes unwarranted claims for the therapeutic properties of the constituents. For example:

". . . the great usefulness of Turpentine in diseases, especially of the Intestinal Infection, such as the Meteorism and Tympanites of Typhoid."

And this absurdity:

". . . where Turpentine, Carbolic Acid or Iodine or even Pepsin is indicated, that it will give satisfaction in each and every case."

Iodinized Emulsion (Scott) is not a "pharmaceutical triumph"; it is an irrational mixture—a reminder of a decadent polypharmacy—sold under misleading and unwarranted claims. It is inadmissible to New and Nonofficial Remedies for conflict with Rules 1, 6, 8 and 10.

Creosotonic (Scott)

Creosotonic (Scott), advertised as a "reconstructive tonic" for the tuberculous, according to the label, contains in each fluidram:

"Alcohol, m. 2½; Creosote and Guaiacol sulphonates of each, gr. 1; Compound Hypophosphites, gr. 1 (including Quinine Hypophosphites, gr. 1/36 and Strychnine Hypophosphites, gr. 1/256), with Iodinized Emulsion (Scott) m. 30."

As in the case of Iodinized Emulsion (Scott), the advertising makes exaggerated therapeutic claims for the individual constituents of the preparation and for the heterogeneous mixture of guaiacol and creosote sulphonates, hypophosphites, quinin, strychnin, turpentine, phenol, iodin, "lactated pepsin," etc. Thus, while it is well established that in guaiacol sulphonate and creosote sulphonate the phenolic constituent is bound so firmly that, when administered, but very little is split off in the organism, yet the advertising claims "that the system can be saturated in a shorter time and with smaller doses of creosote and guaiacol sulphonates than with any other form of these drugs" and that (on the false premise that the guaiacol and creosote from these drugs will permeate the tissues of the lungs) "they help to clear up the local infection and thus aid in returning to normal the diseased mucous membrane."

In the advertising pamphlet, following a discussion of the effect of climate and food in the treatment of the tuberculous, we read:

"While admitting the great importance of the foregoing points, we are firmly of the opinion that proper medication is a great aid in the treatment of pulmonary tuberculosis, and, with this in view, we offer to the profession Creosotonic (Scott) believing that in it we have a superior preparation for this purpose."

This is unwarranted. Of course suitable medication to meet special conditions is proper in the treatment of tuberculosis, but the routine administration of a complex and irrational mixture such as Creosotonic (Scott) is bound to cause inattention to the prime requisites for the proper treatment of the tuberculous—hygienic surroundings and good food.

Creosotonic (Scott) is an irrational mixture, sold under misleading and unwarranted claims. It is inadmissible to New and Nonofficial Remedies for conflict with Rules 1, 6, 8 and 10.

"DEPENDABILITY OF DOSAGE IN TABLETS" —A CORRECTION

To the Editor:—We note with surprise in an article appearing in the department "The Propaganda for Reform" entitled "Dependability of Dosage in Tablets" published in the issue dated July 27, 1918, a reflection on the Tailby-Nason Company which is wholly unwarranted. We feel sure that the reflection resulted through inadvertence in an investigation of fact.

In that article, which treats of the variation of medicinal content in the making of tablets, you include the Tailby-Nason Company, with a number of other corporations as having manufactured tablets found deficient in the above respect. The facts on which your article is based were undoubtedly obtained in part from the report of the Connecticut Agricultural Experiment Station, *Bulletin No. 200*, published under date of December, 1917. Item 11609 on page 167 of *Bulletin No. 200* reads as follows:

"11609. Calomel Tablets, made by Tailby-Nason Co.; stock of Dr. W. R. Hanrahan, Bristol. Claimed per tablet: Calomel 2 grs. Found: Weights of 18 tablets ranged from 153.2 to 169.5, average, 161.7 mgms. Tablets contained 69.34 per cent. of calomel, or from 1.64 to 1.82, average, 1.73 grs. Tablets deficient in calomel."

As soon as we discovered this item in the above publication, we brought to the attention of Dr. E. H. Jenkins, the director and treasurer of the Connecticut Agricultural Experiment Station, the facts, already known to state officials at Hartford, that the statements in the report as to the Tailby-Nason Company were wholly erroneous, as the tablets in question were not manufactured by the Tailby-Nason Company and we were in no way responsible for them. Dr. Jenkins thereupon published a correction of *Bulletin No. 200*, mailing the same to all persons on his mailing list as follows:

CORRECTION

It is stated on page 167 of *Bulletin 200* (being the Food and Drug Report of this station for 1917), that the Calomel Tablets numbered 11609 were made by the Tailby-Nason Company. This statement is incorrect and was based on misinformation given to this Station. The name of the manufacturer cannot be ascertained, but the aforesaid company is not responsible for them.

E. H. JENKINS, Director.

We assume that the writer of the article appearing in THE JOURNAL did not have the copy of the correction before him. You will doubtless appreciate that the error in your article has resulted in giving wide currency to a story already retracted by Dr. Jenkins and is creating a serious injury to our reputation. We are confident that you will be as anxious to avert this injustice as Dr. Jenkins was, and therefore trust that you will make a prompt retraction of the unwarranted, unjust and erroneous reflection upon the Tailby-Nason Company and will give your retraction as much prominence before your subscribers as you have already given to the article appearing in your publication of July 27, 1918.

TAILBY-NASON COMPANY, Frank T. W. Nason, Treasurer,
Boston, Mass.

[EDITORIAL NOTE.—The letter from the Tailby-Nason Company is self-explanatory. It is greatly to be regretted that the correction sent out by the Connecticut Agricultural Experiment Station was neither sent to, nor brought to the attention of, THE JOURNAL until after the article had appeared in this department. THE JOURNAL regrets that it has inadvertently done the Tailby-Nason Company an injustice.]

Correspondence

"RECONSTRUCTION AND REHABILITATION OF THE TUBERCULOUS SOLDIER"

To the Editor:—The article by Lieut.-Col. E. H. Bruns of the National Army (THE JOURNAL, Aug. 3, 1918, p. 373) on the "Reconstruction and Rehabilitation of the Tuberculous Soldier" presents in an interesting manner the plans of the Army Medical Corps in the matter of rehabilitation and vocational training of this class of disabled soldiers. As this is a matter largely of departmental or possibly governmental domestic policy, as stated by Colonel Bruns, it is not my intention to enter into any discussion of it except to say that if the plan can be carried out it would seem that the Federal Board for Vocational Education and the Bureau of War Risk Insurance would have little opportunity to exercise the functions delegated to them by law after the Army Medical Corps had decided to "order all to tuberculosis hospitals" suffering from that disease, and following it by complete vocational training in the industrial shops which are to be built in connection with the hospitals.

The following paragraph from the article, however, interests me, and my purpose in this letter is to correct a statement made probably unintentionally, but nevertheless in ignorance of the facts and the law. Colonel Bruns writes:

The Bureau of War Risk Insurance of the Treasury Department attends to the financial side, for as soon as a tuberculous soldier is discharged, provided his disability is in line of duty, he is entitled to compensation and, if insured, war risk insurance.

The Bureau of War Risk Insurance in pursuance of its compensation and insurance features is charged by law to furnish "such reasonable governmental medical, surgical and hospital services, and with such supplies including artificial limbs, trusses and similar appliances, as the director may determine to be useful and reasonably necessary." This bureau already has a medical section fully organized in several divisions (relief, compensation, tuberculosis, prosthetics, etc.), with men specially trained in medical, surgical and sanitary work, and it is caring for discharged soldiers requiring hospital treatment, numbering thousands at the present time, and is not acting solely as paymaster, as would be implied by this article. Hundreds of tuberculous soldiers are already in sanatoriums all over the country sent by this bureau at its expense, and the United States Public Health Service Sanatorium at Fort Stanton, N. M., the pioneer in government tuberculosis work, is already filled to its capacity and is to care for a large overflow in tents and shacks. These men have gone there voluntarily, not under orders, and I find

them not only willing but eager to go, in order to effect a cure.

To assume that it is necessary to use Army discipline to compel a tuberculous soldier to enter a sanatorium is to deny all professional experience in dealing with that class of cases. It may be true that the old Regular Army man of experience may refuse to go to a sanatorium for reasons not necessary to state here; but I think Colonel Bruns has erred in assuming that the men of the selective army will entertain similar views. Thousands of the selective army come from excellent home environment, and there is a considerable proportion of patients who can be properly and successfully managed in their own homes under the care of their trusted family physicians. Many of them are from the rural districts where they can live in the open under the most favorable hygienic conditions.

In pursuing the course of treatment outlined by Colonel Bruns, the Army Medical Corps will not only deprive the soldier and his family of the compensation for disability which is payable to him only after his discharge, but I venture the opinion that this illegal detention of men unfit for further military service will result in an embarrassing number of legal procedures instituted by the families of these men to procure their freedom and their return to civil life where they belong. Return to civil life is the plan followed in England. I quote from an article by Major P. Horton-Smith Hartley, C.V.O., on "The Care of the Tuberculous Soldier" (*British Medical Journal*, 1918, **1**, 609), in which he writes:

> As soon as it is evident that the patient is suffering from phthisis, or even when this is strongly suspected, he is sent home to one of the military hospitals in this country. If there is no doubt about the diagnosis he comes before a medical board, and in due course is invalided from the army, his further treatment being undertaken by the civil authorities.

This is in line with the logical policy of the act creating the Bureau of War Risk Insurance which authorizes the compensation and, in certain cases, the payment of insurance for discharged men, and is the civil authority charged with providing men of no further military value with hospitalization whenever and wherever necessary. The existing sanatoriums for the treatment of tuberculosis throughout the country, with their experienced and already trained staffs, are not only able but also eager to open and extend their establishments for these discharged soldiers, as I know from official dealings with them. The proposed plan means the development of an enormous permanent military establishment, seeping into all the common activities of civil life, and whatever its theoretical value from the standpoint of the disciplinary treatment of tuberculosis, it is sure to invite widespread opposition from the soldier himself, whose right to a discharge cannot be successfully denied.

Charles E. Banks, M.D., Washington, D. C.
Chief Medical Adviser, Bureau of War Risk Insurance.

SAVING THE WASTE IN DRUGS

To the Editor:—In an attempt to reduce the drug bills at the Bryn Mawr Hospital, the following experiment has been tried:

A list of all the stock on hand was prepared by the night nurses, and it was found that there were, for the seventy beds, about 650 articles on the medicine shelves. This list, of course, included many duplicates or different preparations of the same drugs, as digitalis, and many different strengths of the same drug, for example, eight preparations of calomel in various denominations and in combination with various amounts of soda. There were also many special preparations that had been used a few times in the remote past and had been untouched since.

A list of drugs that seemed an irreducible minimum was then prepared, the editorial on "Sodium versus Potassium" (The Journal, June 1, 1918, p. 1601) being borne in mind, and submitted to the staff for its approval or correction. It comprised some sixty standard preparations, including, for example, calomel in halves and tenths only, morphin in quarters and twelfths, strychnin in thirtieths and fortieths, etc., from which other strengths could readily be made.

It is intended that all future orders shall be made in accordance with this list, and that no special prescriptions shall be written under unusual circumstances. From experience in other hospitals, I have no doubt there is a vast amount of medicine "rusting" on the shelves throughout the country.

Frederic C. Sharpless, M.D., Bryn Mawr, Pa.

A SMALLPOX EPIDEMIC AMONG THE MIAO PEOPLE OF HAINAN

To the Editor:—May 1, 1918, a man came out of the mountains in the interior of Hainan from a Miao village, stating that smallpox had broken out, and asking for vaccine. The Miao people are semiaboriginal, and live by themselves in the depths of the forest. An epidemic of any kind is liable to be extremely disastrous to them.

An assistant was sent in with vaccine. June 13, the chief of the village came to the hospital and reported that smallpox had carried off nearly half of the village. Knowing that the vaccine sent in had been fresh, this information was surprising, and close inquiry brought out the following facts:

1. The epidemic had been extremely fatal.
2. All unvaccinated persons infected died. There were a number in the village not vaccinated, because a sufficient supply was not available, and it takes from two to three weeks for a supply to come from Hongkong.
3. About seven of those vaccinated contracted the disease and died, but in each of these cases the onset was less than four days after vaccination.
4. Several of those vaccinated contracted the disease, but only in a mild form. In these cases the onset was from six to seven days after vaccination.
5. The remainder of those vaccinated did not contract the disease.
6. Surrounding villages escaped the epidemic by voluntarily shunning all intercourse with the stricken village.

These facts are interesting because all the points reported were noted by the chief himself, and conform with remarkable accuracy to our knowledge of the epidemiology of the disease.

Nathaniel Bercovitz, M.D., Kachek, Hainan, China.

Queries and Minor Notes

Anonymous Communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

DIPLOSAL AND ACETYLSALICYLIC ACID

To the Editor:—For five or six years I have been using diplosal entirely instead of the soluble, irritating, nauseous salicylates. Since the war has been going on, diplosal has become so scarce that its cost is prohibitive to my poorer patients. I would regret having to return to sodium salicylate, so I am writing to ask if American pharmacy is supplying a practical substitute or equivalent of diplosal. If not, please advise me what I can best prescribe.

Samuel E. Woody, M.D., Louisville, Ky.

Answer.—Possibly because it is not now advertised, the demand for diplosal is not sufficient to induce American manufacturers to apply to the Federal Trade Commission for a license to manufacture this product in the United States. Diplosal is the salicylic ester of salicylic acid, and in the intestine is broken up into salicylate. The only advantages of diplosal over sodium salicylate, as pointed out by our correspondent, consist in its lesser solubility, and therefore in the taste. The same advantages are possessed by acetylsalicylic acid, which may be used in the same dosage as diplosal.

GRIMBERT'S METHOD—HAY SULPHUR TEST

To the Editor:—1. Please describe Grimbert's method for determining bile pigments. 2. What is the Hay sulphur test for bile salts in the urine?

Louis Hannah, M.D., Sandersville, Ga.

Answer.—1. Ten parts of urine are treated with 5 parts of barium chlorid solution, and the precipitate is filtered off and then suspended in 4 parts of alcohol containing 5 per cent.

hypochloric acid. The mixture is heated one or two minutes on the steam bath. A green color or fluorescence signifies bile pigments. If a brown coloration is present, addition of hydrogen peroxid will change it to green. The absence of bile pigment is indicated by no coloration (Merck's Reagenzien-Verzeichnis, 1913, p. 136).

2. Hay's test, described in Webster's "Diagnostic Methods," depends on the reduction of the surface tension of the urine in the presence of bile acids. A pinch of powdered sulphur is sprinkled on the surface of the urine, which should be preferably at a temperature of 17 C. In normal urines the sulphur will float on the surface. If bile acids are present the sulphur may sink at once, indicating 1 part in 10,000, or may sink only after a few seconds, indicating 1 part in 50,000. Phenol or anilin compounds also lower the surface tension of the urine so that their presence may lead to wrong conclusions.

ALLOTMENT TO FAMILIES OF PRIVATES

To the Editor:—I understand that in the case of privates in the Army the government pays an amount equal to that allotted by the private to his family. Does the same rule apply to the officers of the Medical Reserve Corps?

O. S. TENLEY, M.D., Wabeno, Wis.

ANSWER.—This does not apply to commissioned officers.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ALASKA: Juneau, Sept. 3. Sec., Dr. L. P. Dawes, Juneau.

ARIZONA: Phoenix, Oct. 1. Sec., Dr. Allen H. Williams, 219 Goodrich Bldg., Phoenix.

COLORADO: Denver, Oct. 1. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.

DISTRICT OF COLUMBIA: Washington, Oct. 8. Sec., Dr. Edgar P. Copeland, The Rockingham, Washington.

GEORGIA: Atlanta, Oct. 8-9. Sec., Dr. C. T. Nolan, Marietta.

HAWAII: Honolulu, Sept. 9-13. Pres. R. W. Benz, 1141 Alakea St., Honolulu.

IDAHO: Boise, Oct. 1-2. Sec., Dr. Ray H. Fisher, Rigby.

IOWA: Des Moines, Sept. 10-12. Sec., Dr. G. H. Sumner, Capitol Bldg., Des Moines.

KANSAS: Topeka, Oct. 8-9. Sec., Dr. H. A. Dykes, Lebanon.

MASSACHUSETTS: Boston, Sept. 10-12. Sec., Dr. W. P. Bowers, Room 501-1 Beacon St., Boston.

MICHIGAN: Lansing, Oct. 8-10. Sec., Dr. B. D. Harison, 504 Washington Arcade, Detroit.

MINNESOTA: Minneapolis, Oct. 1-4. Sec., Dr. T. McDavitt, 741 Lowry Bldg., St. Paul.

MISSOURI: Kansas City, Sept. 30-Oct. 2. Sec., Dr. George H. Jones, State House, Jefferson City.

MONTANA: Helena, Oct. 1. Sec., Dr. S. A. Cooney, Power Bldg., Helena.

OKLAHOMA: Oklahoma City, Oct. 8-9. Sec., Dr. J. J. Williams, Weatherford.

RHODE ISLAND: Providence, Oct. 3. Sec., Dr. B. U. Richards, 315 State House, Providence.

Ohio June Examination

Dr. H. M. Platter, secretary of the Ohio State Medical Board, reports the oral, practical and written examination held at Columbus, June 4-7, 1918. The examination covered 10 subjects and included 100 questions. According to information supplied, 127 candidates were examined, of whom 126 passed and 1 failed. Twenty candidates were licensed through reciprocity. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
College of Physicians and Surgeons, Boston		(1907)	76
Harvard University		(1918)	88.6
Tufts College Medical School		(1917)	89.9
Columbia University		(1915)	89.6
University and Bellevue Hosp. Med. College		(1918)	88.9
Cleveland Homeopathic Medical College		(1903)	77.4
Eclectic Medical College	(1917) 77; (1918) 75.3, 76.6, 78.4, 81, 82.1, 82.8, 83.3, 83.8, 85.4, 86.5, 86.5, 87, 87.1.		81.7,
Ohio State University College of Medicine	(1918) 80.6, 81.5, 82.5, 83.4, 84.3, 84.4, 84.9, 85.2, 85.2, 85.6, 86.2, 86.6, 86.8, 87.3, 88.4, 88.8, 88.9, 89.6, 90.4, 91, 91.7, 95.3.		
Ohio State University College of Homeopathic Medicine	(1918) 78.1, 81, 82.5, 82.7, 83.6, 84.3, 85.7, 86, 86.4, 87.4, 89, 91.7.		
University of Cincinnati	(1918) 81.9, 82, 82.9, 82.9, 83.4, 83.8, 84.1, 84.4, 84.5, 85, 85.7, 86.1, 86.6, 87.2, 87.5, 87.7, 88.2, 89.3, 89.4, 90.0, 90.3, 90.5, 91.5.		
Western University	(1918) 84.1 84.2, 84.4, 84.4, 84.8, 84.9, 85.3, 85.5, 85.9, 86, 86.1, 86.2, 86.2, 86.6, 86.7, 86.9, 87.1, 87.3, 87.3, 87.4, 87.4, 87.5, 87.7, 88.2, 88.2, 88.2, 88.3, 88.6, 88.7, 88.9, 89.5, 89.6, 89.8, 89.9, 90.8, 90.9, 91.3, 91.5, 91.6, 92.3.		
Hahnemann Medical College of Philadelphia		(1879)	88.5
Temple University		(1917)	81.6
University of Pennsylvania		(1917)	80.2
University of Pittsburgh		(1917)	88.4
Meharry Medical College		(1916)	75, 75.9
University of Toronto		(1911)	83.3
National University, Athens		(1895)	75+

College	FAILED	Year Grad.	
Meharry Medical College		(1917)	71.3

College	LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
Chicago College of Medicine and Surgery		(1917)	Illinois
Hahnemann Medical College and Hospital of Chicago		(1873)	Illinois
University of Louisville		(1916)	Kentucky
University of Maryland		(1903)	Maryland
Harvard University		(1905)	Vermont
Detroit College of Medicine and Surgery		(1917)	Michigan
University of Michigan Homeo. Med. School		(1910) (1914)	Michigan
Barnes Medical College		(1898)	Illinois
University Medical College of K. C.		(1903)	Kansas
Eclectic Medical College		(1913)	California
Miami Medical College		(1892)	Kentucky
Starling-Ohio Medical College		(1913)	W. Virginia
University of Pennsylvania		(1890)	Penna.
University of Pittsburgh		(1913)	Penna.
Meharry Medical College		(1913) (1914)	Alabama
Marquette University		(1916)	Wisconsin
University of Vienna, Austria		(1900)	Missouri
National University, Athens		(1905)	Minnesota

Delaware June Examination

Dr. Henry W. Briggs, secretary of the Medical Council of Delaware, reports the practical and written examination held at Wilmington, June 18-20, 1918. The examination covered 10 subjects and included 100 questions. An average of 75 per cent. was required to pass. Of the 8 candidates examined, 7 passed and 1 failed. Six candidates were licensed through reciprocity. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
College of Phys. and Surg., Baltimore		(1912)	78.9
University of Maryland		(1917)	87.6
New York Homeo. Med. Coll. and Flower Hosp.		(1918)	75
Hahnemann Med. Coll. and Hosp. of Philadelphia		(1918)	83
Jefferson Med. Coll.		(1916) 82; (1918)	82.6, 88.6

College	FAILED	Year Grad.	
University of Maryland		(1917)	73.6

College	LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
University of Maryland		(1901) (1916),	Maryland
Columbia College in the City of New York		(1894)	New York
Jefferson Medical College		(1904) (1912) (1914)	Penna.

Book Notices

LES LÉSIONS DU CORPS THYROIDE DANS LA MALADIE DE BASEDOW. Par Gustave Roussy, Professeur agrégé à la Faculté de Médecine de Paris. Paper. Price, 3 francs. Pp. 135, with 10 illustrations. Paris: Masson et Cie, 1914.

This monograph was prepared for presentation at Luxembourg in August, 1914, before the Twenty-Fourth Congress of Alienists and Neurologists of France and those countries speaking the French language. It is a comprehensive statement of fact and theory concerning the symptomatology, etiology, pathology and treatment of exophthalmic goiter. The author submits anatomic and physiologic observations of his own and of Clunet's in the development of his theme, laying particular emphasis on the association of a persistent thymus with certain changes in the thyroid gland as characteristic of exophthalmic goiter On the histologic side he emphasizes as features of diagnostic importance the presence in the thyroid of islets of eosinophilic thyroid epithelium as well as aggregations of lymphoid cells. Colored plates illustrate his findings. After discussing the nervous or sympathetic theory, which accounts for the symptomatology and signs of exophthalmic goiter as a result of stimulation of the cervical sympathetic, he passes on to the relation of the thyroid gland to the other glands of internal secretion (genital glands, hypophysis, suprarenals and pancreas), ending with emphasis of the importance of a persistent thymus with changes in the thyroid as a cause of the disease. In discussing the treatment of the intoxication resulting from an "adulterated secretion" of the hyperplastic thyroid gland, he expresses the opinion that radiotherapy will ultimately replace the surgical interference commonly practiced now in cases not amenable to rest and internal medication. The subject in all its aspects is developed along historical lines with a

decidedly French perspective. The chief object of the author apparently (judging from the audience for which the treatise was written as well as from repeated statements in the text) was to convince certain authors, especially the French, that exophthalmic goiter is the result of a derangement of certain glands of internal secretion (the thyroid and the thymus), and that the disease should, therefore, not be classified "among the affections of the nervous system." His own contributions incorporated in the monograph would certainly not justify the lengthy presentation of facts so generally known to most medical men.

Burns and Their Treatment, Including Dermatitis from High Explosives. By J. M. H. Macleod, M.A., M.D., F.R.C.P., Physician for Diseases of the Skin, Charing Cross Hospital. Cloth. Price, $2. Pp. 160, with 19 illustrations. New York: Oxford University Press, 1918.

One of the favorite topics of war medicine in England is burns. Perhaps for this reason many authors present complicated descriptions of treatment. Thus, Macleod classifies burns from heat under six degrees—a classification that surely is more of a burden than an aid. In the discourse on the technic of treatment, Macleod seems to lack the faculty of giving simple, clear directions. Of course, no book on this subject would be complete without including the paraffin film treatment, but the author evidently has accepted Hull's work entirely, without referring at all to the American contributions. He gives the composition of Ambrine as "paraffin, resin and oleum succini"; the Chemical Laboratory of the American Medical Association reported it to be composed mostly of paraffin, with small amounts of an asphalt-like body and a fatty oil resembling sesame. Macleod also gives the complicated formula of Hull for making a "hot" wax, wherein no attention is paid to the important physical attributes of the paraffin. He neglects entirely to mention that paraffin alone, of proper consistency, has been found by the advanced workers in America to be as good as the wax mixtures, if not better. Besides the chapters on burns from heat, there are chapters on burns from electricity, corrosives, the roentgen ray, the sun and corrosives, and a chapter on dermatitis from high explosives. The book is one of a series of war primers published in England, somewhat like the series of medical war booklets published by the Surgeon-General's Office of the United States Army. In common with this series the Oxford War Primers seem to be rather high in price for the quantity and quality of material furnished.

A Handbook for School Nurses. By Helen W. Kelly, R.N., Superintendent of Field Nurses, Department of Health, Chicago, and Mabel C. Bradshaw, R.N., Superintendent of School Nurses, Board of Education, Milwaukee. Cloth. Price, $1. Pp. 109. New York: The Macmillan Company, 1918.

The authors believe that no prophetic vision is required to foresee a rapidly extending field of activity for the school nurse, and think that in the near future she will be known, not as the school nurse, but as the director of school hygiene. As such, she should be charged with the responsiblity for all the health conditions of the school, ventilation, heating and lighting, and should lecture on hygiene and physiology and be general health adviser to the entire school population. They state also that if social hygiene is to be taught in the schools, the school nurse is the proper person to teach it. The book starts with a historical sketch of the subject, and then goes on to discuss at length the work of the school nurse and the medical inspection of schools. It should be of interest to parents as well as to nurses.

Siliceous Dust in Relation to Pulmonary Disease Among Miners in the Joplin District, Missouri. By Edwin Higgins, A. J. Lanza, F. B. Laney and George S. Rice. Bulletin 132, Department of the Interior, Bureau of Mines. Paper. Price 25 cents. Pp. 116, with 38 illustrations. Washington: Government Printing Office, 1917.

This bulletin gives a useful general review of the origin and effects of mine dust, as well as a study of the special conditions mentioned in the title. It is evident that the morbidity is high among workers in mines where the dust is of a siliceous character, and that the health problem is a serious and important one. Such studies as this by the proper governmental organizations are of great value.

Society Proceedings

COMING MEETINGS

Am. Assn. of Electro-Therapeutics and Radiology, Boston, Sept. 10-12.
Am. Assn. of Obstetricians and Gynecologists, Detroit, Sept. 16-18.
American Association of Railway Surgeons, Chicago, Oct. 16-18.
American Public Health Association, Chicago, Oct. 14-17.
Am. Roentgen Ray Society, Ft. Oglethorpe, Ga., Sept. 4-6.
Colorado State Medical Society, Estes Park, Sept. 9-11.
Delaware State Medical Society, Wilmington, Oct. 8.
Indiana State Medical Association, Indianapolis, Sept. 25-27.
Kentucky State Medical Association, Louisville, Sept. 3-6.
Minnesota State Medical Association, Duluth, Aug. 28-30.
Missouri Valley Medical Society, Omaha, Sept. 19-20.
New Mexico Medical Society, Albuquerque, Oct. 7-8.
Ohio State Medical Association, Columbus, Oct. 1-3.
Pennsylvania State Medical Society, Philadelphia, Sept. 23-26.
Utah State Medical Association, Salt Lake City, Sept. 10-11.
Vermont State Medical Society, Burlington, Oct. 10-11.
Virginia State Medical Society, Richmond, Oct. 22-25.
West Virginia State Medical Association, Harpers Ferry, Oct. 1-3.
Wisconsin State Medical Society, Milwaukee, Oct. 2-4.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Physiology, Baltimore

July, 1918, **46**, No. 4

1 *Effects of External Temperature, Morphin, Quinin and Strychnin on Thyroid Activity. C. A. Mills, Lawrence, Kan.—p. 329.
2 *Physiology of Stomach. Gastric Secretion and Urine Ammonia. A. C. Ivy, Chicago.—p. 340.
3 *Effects of Epinephrin on Distribution of Blood. Venous Discharge from Suprarenal Glands. R. E. L. Gunning, Chicago.—p. 362.
4 Antgenic Property of Closed Intestinal Loop Fluid. C. A. Dragstedt, L. R. Dragstedt and C. S. Chase, Iowa City.—p. 366.
5 *Studies on Thromboplastic Action of Cephalin. S. A. Waksman, Berkeley, Calif.—p. 375.
6 Activities of Decerebrate and Decerebellate Chicks. E. G. Martin and W. H. Rich, San Francisco.—p. 396.
7 Effect on Body Temperature Induced by Thermal Stimulation of Heat Center in Brain of Cat. A. L. Prince and L. J. Hahn, New Haven, Conn.—p. 412.
8 Effect of Volume of Hind Limb Induced by Heating and Cooling Corpus Striatum of Rabbit. A. L. Prince and L. J. Hahn, New Haven, Conn.—p. 416.
9 *Physiology of Stomach: Studies in Water Drinking. A. C. Ivy, Chicago.—p. 420.
10 Experiments on Nature of Sense of Smell in Common Catfish, Amiurus Nebulosus (Lesueur). J. M. D. Olmsted.—p. 443.
11 Relation of Dorsal Roots of Spinal Nerves and Mesencephalon to Control of Respiratory Movements. H. C. Coombs, New York.—p. 459.
12 Effect of Epinephrin on Irritability and Contractility of Mammalian Nerve Muscle Preparations After Death. C. M. Gruber and A. P. Fellows.—p. 472.
13 Supposed Relation of Sympathetic Nerves to Decerebrate Rigidity, Muscle Tone and Tendon Reflexes. S. Cobb, Baltimore.—p. 478.
14 *Noneffect of Corpus Luteum Preparations on Ovulation Cycle of Rat. G. W. Corner and F. H. Hurni, San Francisco.—p. 483.

1. **Factors Influencing Thyroid Activity.**—Mills found that high external temperatures cause a diminished activity of the thyroid glands of animals, as judged by morphology, together with a slowing of the rate of growth. Low external temperatures, on the contrary, increase the thyroid activity and also seem to cause a faster rate of growth. Morphin and quinin appear to decrease the activity of the gland, probably as a result of the lessened metabolism and diminished heat production. Strychnin, on the other hand, causes greater thyroid activity, very likely by increasing metabolism through its action on the spinal cord.

2. **Gastric Secretion and Urine Ammonia.**—Ivy says that the ammonia excretion after the ingestion of a meal varies slightly in the same individual and markedly in different individuals. There was an increase in urine ammonia after the ingestion of a meal in the majority of cases studied in this series. A marked increase occurred in the dogs worked on. During gastric stimulation by food or by water followed by absorption in the intestine there is an increase in urine ammonia. The degree of increase in urine ammonia on the

absorption of acid chyme is dependent on the rate of absorption of the acid chyme or, in other words, its fluid consistency. During gastric secretion not followed by absorption in the intestine no increase in urine ammonia occurs. The absorption of water from the intestine (distal or proximal) causes some diuresis but no change in urine ammonia. The absorption of alkali from the intestine causes diuresis with a marked decrease in urine ammonia. The absorption of acid from the intestine causes some diuresis with an increase in urine ammonia. Diuresis per se causes no change in urine ammonia. Intravenous injection of water causes some gastric stimulation but no increase in urine ammonia or urine output. So gastric secretion and urine ammonia are related in that the urine ammonia is increased by the absorption in the intestine of the acid product of gastric secretion, provided that this acid secretion is absorbed before neutralization occurs, that is, at a relatively fast rate.

3. **Venous Discharge from Suprarenal Glands.**—Intravenous injections of epinephrin produced no essential changes in the blood flow through the suprarenal glands. The changes produced passively follow the general arterial pressure. The splanchnic nerves do not carry vasomotor fibers to the suprarenal glands.

5. **Thromboplastic Action of Cephalin.**—In testing the thromboplastic action of cephalin Waksman adopted the method of Howell with the following modifications: (*a*) Blood plasma containing 0.2 to 0.25 per cent. of sodium citrate was found to be well suited for these tests; (*b*) a standard solution of calcium hydrate can be substituted for serum, thus eliminating one or more unknown factors. The function of the serum in the plasma serum-cephalin mixture consists in supplying the calcium necessary for neutralizing the excess of anticoagulant in the plasma and probably in supplying more prothrombin. By using calcium hydrate to neutralize the excess of anticoagulant in the plasma, an optimum concentration is found, above which the excess of calcium will delay the coagulation of the plasma. There is always a maximum concentration of the cephalin in the water solution which gives the most rapid coagulation; a further increase in the concentration of the cephalin will not result in an increase in the rapidity of coagulation; by decreasing the concentration of the cephalin below this maximum a delay in the coagulation will result. This concentration seems to fall between 0.25 and 0.30 per cent. for the lots tested. Cephalin kept in a vacuum acts much better as a thromboplastic agent than the same lot of cephalin kept in loosely stoppered containers. The cephalin obtained from the brains of different animals does not differ greatly as a thromboplastic agent; the slight differences obtained were probably due to the impurities and methods of keeping the material. Cephalin dissolved in water loses to some extent its thromboplastic properties, particularly old lots of cephalin kept exposed to the air. Since coagulation of the blood is an enzymatic phenomenon it is much more rapid both in the presence and in the absence of cephalin at 37 than at room temperature. Serum 7 days old is less active than fresh serum in accelerating the clotting of the blood; this was corrected, with the method used, by the addition of a solution of calcium hydrate; fresh serum is not depreciated in its action on the plasma-cephalin mixture by the presence of old serum but is even slightly accelerated. Surgical gauze impregnated with cephalin was also tested by the above method and found to increase the rapidity of the coagulation of the plasma.

9. **Studies in Water Drinking.**—According to Ivy's observations the ingestion of water with the meals (400 to 800 c.c.) increases the amount and the free and total acidity of the gastric juice. The ingestion of water with the meals decreases the emptying time of the stomach, due to the dilution of the stomach contents. Food in the stomach retards the evacuation of water. The emptying time of water from the normal human stomach varies, conservatively from 400 to 100 c.c. in fifteen minutes. The manner of the discharge of water from the dog's stomach is, according to the observations on four dogs, rhythmic and could very possibly correspond to peristaltic waves. All stomachs do not respond to stimulation by water, there being a marked variation in different individuals. Those stomach that empty water slowly (150 c.c. or less in fifteen minutes when 400 c.c. are drunk) respond much more than those that empty water fast. From the observations in this study water cannot be substituted for the Ewald meal. The latent period of the gastric glands of man when stimulated by water is from five to seven minutes. It was impossible to demonstrate a fatigue of the gastric glands when stimulated by water or by gastrin for a period of ten to twenty-six minutes.

14. **Effect of Corpus Luteum on Ovulation Cycle.**—The intraperitoneal injection of large doses of desiccated mammalian corpus luteum substance does not inhibit ovulation in the rat.

Boston Medical and Surgical Journal

August 1, 1918, **179**, No. 5

15 Modern Principles in Control and Management of Cancer. E. Reynolds, Boston.—p. 147.
16 Energy Content of Extra Foods. C. G. Benedict and F. G. Benedict, Boston.—p. 153.
17 Impacted Stones of Bladder and Urethra. W. D. Bieberbach, Worcester.—p. 163.
18 Training School for Hospital Apprentices at Boston City Hospital. J. A. Foley, Boston.—p. 162.

Journal of Biological Chemistry, Baltimore

July, 1918, **35**, No. 1

19 Isolation and Identification of Stachydrin from Alfalfa Hay. H. Steenbock, Madison, Wis.—p. 1.
20 *Determination of Cholesterol in Blood Serum. A. Bernhard, New York.—p. 15.
21 Choice Between Adequate and Inadequate Diets, as Made by Rats. T. B. Osborne and L. B. Mendel, New Haven, Conn.—p. 19.
22 *Amino-Acids of Mature Human Placenta. V. J. Harding and C. A. Fort, Montreal, Canada.—p. 29.
23 Rate of Color Production in Alkaline Solutions of Dextrose and Picrate. T. Addis and A. E. Shevky, San Francisco.—p. 43.
24 Modification of Picrate Method for Blood Sugar Determinations. T. Addis and A. E. Shevky, San Francisco.—p. 53.
25 *Dietary Qualities of Barley. H. Steenbock, H. E. Kent and E. G. Gross, Madison, Wis.—p. 61.
26 Origin of Creatin. L. Baumann and H. M. Hines, Iowa City, Iowa.—p. 75.
27 Effect of Variations in Available Alkali on Yield of Acetone in Oxidation of Butyric Acid with Hydrogen Peroxid. E. J. Witzemann, Chicago.—p. 83.
28 *Ammonia Excretion as Influenced by Ingestion of Alkalies. W. Denis and A. S. Minot, Boston.—p. 101.
29 *Casein of Human Milk. A. W. Bosworth and L. A. Giblin, Boston.—p. 115.
30 Preparation of Ovalbumin and Its Refractive Indices in Solution. A. R. C. Haas, Berkeley, Calif.—p. 119.
31 *Preparation of Pure Casein. L. L. Van Slyke and J. C. Baker, Geneva, N. Y.—p. 127.
32 Method for Making Electrometric Titrations of Solutions Containing Protein. J. C. Baker and L. L. Van Slyke, Geneva, N. Y.—p. 137.
33 Free Lactic Acid in Sour Milk. L. L. Van Slyke and J. C. Baker, Geneva, N. Y.—p. 147.

20. **Determination of Cholesterol in Blood Serum.**—The method presented by Bernhard can be completed in about five hours, and shortens the number of operations necessary to complete the determination. The results are almost identical with those obtained by the Henes method. The revised method obviates the necessity of extraction for twenty-four hours with alcohol and again for twenty-four hours with ether, since treatment with alcohol-ether mixture insures complete extraction of cholesterol almost immediately. By the use of the alcohol-ether mixture both steps are combined in one operation. The calcium hydroxid precipitate of cholesterol after saponification is dried in an electric oven instead of allowing it to dry in the air over night. An absolutely dry sediment is thus obtained. Treatment of this dry sediment with ether for half an hour is sufficient for complete extraction of the cholesterol, whereas Henes extracts the sediment with ether for twenty-four hours.

22. **Amino-Acids of Human Placenta.**—A determination of the amino-acids in mature human placenta has been made by Harding and Fort according to the nitrogen distribution method of Van Slyke. The distinguishing feature of the placenta protein is a high arginin content. This is double the arginin content found in other human organs (breast, liver, heart, kidney and muscle). Corresponding to this difference, there must be ascribed to the placenta a function

differing from that of other organs. The placenta from a chemical standpoint cannot be regarded entirely as a passive organ.

25. **Dietary Qualities of Barley.**—In this paper are presented the results of experiments with barley which in themselves may not offer any striking peculiarities, yet they may serve to allay the fears of those dietitians concerned over the use of barley as a wheat substitute. By comparison of these data with such data as are available for maize, oats, and wheat it is indicated that the barley kernel does not differ essentially from these grains in its nutritive properties. Barley alone is unable to meet the demands of the growing animal or even to allow noteworthy amount of growth to take place. The addition of the fat-soluble vitamine in the form of butter fat improves its growth promoting quality to some extent, but the addition of casein is of little if any benefit. In fact the animals on this latter ration seemed to be more susceptible to cutaneous infection. Of the single additions, the salt mixture by satisfying the demands of the animal for the elements in the group calcium, chlorin, and sodium exerted the most beneficial influence. When only these were supplied, however, the animals were not able to maintain themselves as long as when the complete salt mixture was added. Gaseous intestinal fermentation with abnormal distention of the tract seemed to be the immediate cause of death. The important rôle of the mineral elements is again brought out when multiple additions were made; only where salts were one of the additions was substantial growth noted. Where all these additions, that is, salts, protein and fat-soluble vitamine, were made, normal growth, reproduction, and rearing of the young became possible.

Barley contains an abundance of the water-soluble vitamine. Even when the amount of barley was reduced to 60 per cent. of the ration it was found possible for a female to rear a litter of young. On 40 per cent. of barley growth was entirely normal, but no young were reared. On 20 per cent. growth was not quite normal. Barley is deficient in the fat-soluble vitamine. The protein content of barley (13.6 per cent.) is too low for continued growth at the normal rate. The primary growth determinant in barley is inorganic salts. Of secondary importance, but no less urgent, are protein and fat-soluble vitamine.

28. **Ammonia Excretion as Influenced by Ingestion of Alkalis.**—By the intermittent administration to nephritics of small doses of sodium bicarbonate it has been possible to obtain urines absolutely free from even traces of ammonia. An attempt to duplicate these results on normal subjects has been unsuccessful. The authors' results furnish support to the theory that the sole use of urinary ammonia is for the neutralization of acids found during the normal metabolic processes, and would seem to render superfluous the speculations regarding the residual ammonia fraction of urine.

29. **Casein of Human Milk.**—A considerable quantity of pure casein has been prepared by Bosworth and Giblin from human milk. This casein was found to resemble the casein from cow's and goat's milk in the following respects: It has the same nitrogen, phosphorus and sulphur content; it has the same degree of valency, and gives the same series of salts with bases; it has the same molecular weight; it is acted on by rennin in the same manner; the paracasein produced by the action of rennin is similar to the paracasein produced by the action of rennin on the casein of cow's milk.

31. **Preparation of Pure Casein.**—Casein in pure form, free from inorganic phosphorus, calcium and hydrolytic products, is prepared by treating undiluted milk with normal acid, preferably lactic or a mixture of 1 part of hydrochloric and 2 parts of acetic. The acid is introduced slowly into the undiluted milk below the surface, the tip of the tube carrying the acid into the milk being so arranged that it is very close to a mechanical stirrer revolving at a high speed and also near the bottom of the vessel containing the milk. Under these conditions the acid does not cause coagulation of the casein at the point where the acid first comes into contact with a portion of the milk. Details of precipitation, washing and drying of the casein are given. Ash and phosphorus contents are unusually low, being about 0.10 per cent. of ash and 0.80 per cent. of phosphorus, with no calcium. By this method casein can be prepared within ten hours. Excess of acid with danger of hydrolysis is avoided. Contact with reagents is reduced to a minimum. The product is a very fine white powder. It contains neither inorganic phosphorus nor calcium. It dissolves at once in dilute solutions of monobasic alkalies and also in excess of lime water to a clear solution. Lime water solutions of this casein, when neutral, are opalescent. The yield of the casein from milk is practically quantitative.

Kentucky Medical Journal, Bowling Green

August, 1918, **16**, No. 8

34 Prostatism. W. T. Briggs, Lexington.—p. 334.
35 Case of Typhus. J. A. Flexner, Louisville.—p. 339.
36 Camp Sanitation. L. R. Poust, Camp Zachary Taylor.—p. 348.
37 Acute Articular Rheumatism. U. V. Williams, Frankfort.—p. 350.
38 Rhinoliths. W. D. Levi, Louisville.—p. 351.
39 Some Common Remedies in Every Day Use. L. L. Solomon, Louisville.—p. 352.
40 Acute Secondary Parotitis or Sialo-Adenitis, Following Abdominal Operations. C. G. Forsee, Louisville.—p. 358.
41 Gallbladder Cases. C. W. Karraker, Louisville.—p. 360.
42 Clinical Study of Faucial Tonsil in Adult and Its Treatment. A. L. Bass, Louisville.—p. 363.
43 Chorea Minor. W. L. Mosby, Bardwell.—p. 369.
44 Unusual Case of Lobar Pneumonia. F. C. Askenstedt, Louisville.—p. 370.
45 Cholera Infantum. H. T. Crouch, Bardwell.—p. 371.

Medical Record, New York

August 3, 1918, **94**, No. 5

46 Modern Standards in Abnormal Obstetric Cases and Their Treatment. J. W. Markoe, New York.—p. 177.
47 War Neuroses in Women. G. F. Boehme, Jr., New York.—p. 180.
48 Cancer, Disease of Deficiency. J. Round, London.—p. 184.
49 Point of Entry. D. H. Stewart, New York.—p. 191.
50 Congenital Laryngeal Stridor; Report of Two Cases. J. Levy, Newark, N. J.—p. 193.
51 Drug Addiction and Medical Practitioner. T. W. Edgar, New York.—p. 194.
52 Simple Therapeutic Test of Thyroid Function. H. R. Harrower, Los Angeles.—p. 196.

Michigan State Medical Society Journal, Grand Rapids

August, 1918, **17**, No. 8

53 Fragilitas Ossium; Report of Three Cases. F. L. Rose, Jackson.—p. 307.
54 Thyroid Gland with Special Reference to Goiter. J. G. Sherrill, Louisville.—p. 309.
55 So-Called Bladder Diseases. S. Levin, Lake Linden.—p. 316.
56 Roentgentherapy in Gynecology. G. E. Pfahler, Philadelphia.—p. 320.
57 Three Cases of Organic Brain Disease with Aphasia and Agnosis. A. M. Barrett, Ann Arbor.—p. 330.
58 Case of Transverse Myelitis from Bullet Wound. C. L. Washburne, Ann Arbor.—p. 334.
59 Etiology and Treatment of Dystocia of Cervical Origin; Report of Four Cases. H. Henderson, Ann Arbor.—p. 336.

Modern Hospital, St. Louis

August, 1918, **11**, No. 2

60 Standardization of State Hospitals. A. L. Bowen, Springfield, Ill.—p. 81.
61 Nurses' Home of Hackensack Hospital. F. P. Washburn, Hackensack, N. J.—p. 84.
62 Methods of Indexing Hospital Clinical Records. M. Byrne, Chicago.—p. 86.
63 Has Every Hospital an Inherent Right to an Intern? J. M. Baldy, Philadelphia.—p. 89.
64 Floating Hospital of St. John's Guild Again at Work. J. W. Beckman, New York.—p. 92.
65 Green Operating Room at St. Luke's Hospital, San Francisco. H. M. Sherman, San Francisco.—p. 97.
66 State Sanatorium and Labor Problem. S. A. Douglass, Mount Vernon, Ohio.—p. 99.
67 Hospital Accounting. C. A. Porter and H. K. Carter.—p. 102.
68 Little Journeys to Places and People Worth Knowing. M. J. Robinson, Chicago.—p. 108.
69 Conduct of Hospitals. R. W. Corwin, Pueblo, Colo.—p. 113.
70 Business of Medicine and Profession of Medicine. J. G. Bowman, Chicago.—p. 123.
71 General Hospital. A. J. Ochsner, Chicago.—p. 124.

New York Medical Journal

August 3, 1918, **108**, No. 5

72 Ophthalmic Changes in Tabes and Paresis. I. S. Wechsler, New York.—p. 181.
73 Successful Treatment of Chronic Pathogenic Infections of Lower Respiratory Tract. I. W. Voorhees, New York.—p. 189.

74 Why Is Asparagus Forbidden During Gonorrhea? H. G. Klotz, White Plains.—p. 191.
75 Rectal Cases. A. A. Landsman, New York.—p. 194.
76 How Can We Get Enough Sleep? E. F. Bowers, New York. —p. 196.
77 Hirschsprung's Disease with Eventration of Right Half of Diaphragm. E. A. Aronson, New York.—p. 196.
78 Examination of Recruits for Tuberculosis. R. C. Matson, Portland, Ore.—p. 199. To be concluded.

Philippine Journal of Science, Manila

March, 1918, **13**, Sec. B, No. 2

CORRECTION

79 *Infections with Coccidium and Isospora in Animals in Philippine Islands and Their Possible Clinical Significance. F. G. Haughwout, Manila.—p. 79.

79. **Infections with Coccidium.**—In THE JOURNAL, April 27, 1918, p. 1262, an error was made in abstracting Haughwout's article. His paper is not a report of cases occurring in the Philippines, but a review of the general problem of human coccidiosis and its possible relation to animal coccidiosis. So far as Haughwout has knowledge, no case of human coccidiosis has been reported in the Philippine Islands, but conditions supervening on the war have led to the discovery in other parts of the world of many cases of undoubted coccidial infection, and these cases, taken in conjunction with older but less exact reports of similar infections, Haughwout believes justify the belief that coccidiosis of man may in time to come be looked on as a definite clinical entity and a condition that may crop up at almost any time or place. The thirty-four cases referred to by him in this paper are recorded in the literature but were not seen by Haughwout.

Haughwout and his co-workers have found coccidia in domestic animals and the morphology of these organisms is being studied exhaustively. The author emphasizes that the main thing that the observer must be on his guard against is the confusing of the cysts of helminths, particularly the eggs of trematodes and of hookworms, with coccidial cysts and vice versa. As a rule, the eggs of helminths will be found to be much larger than the sporozoan cysts, but there is no denying the fact that unsegmented eggs of this type do bear a striking resemblance to the oocysts of coccidia, and this resemblance may even extend to the early stages of segmentation of the eggs, particularly the two-cell stage. The best plan is to dilute the stool with a considerable quantity of water and set a number of the cysts aside in a moist chamber for two or three days.

In the coccidial cysts the protoplasm entirely fills the cyst in the early stage, but later it contracts to a spherical mass in the center, leaving clear spaces at each pole of the cyst. Eventually this mass divides, in the case of *Isospora* into two masses and in the case of *Coccidium* into four masses. A cyst membrane forms around each of these daughter masses, and some hours later sporozoites and a mass of residual protoplasm can be made out in each of the sporocysts that are continued within the oocyst. *Isospora* forms four sporozoites in each sporocyst and *Coccidium* two. This establishes the identification beyond a doubt. All these changes may be seen by making examinations of the cysts under the microscope at varying intervals, or the cysts may simply be set aside in the moist chamber for from forty-eight to seventy-two hours and then examined. It is a comparatively simple matter to isolate individual cysts with a capillary pipet under the microscope.

South Carolina Medical Association Journal, Greenville

July, 1918, **14**, No. 7

80 What Shall We Do With Hernia Cases? J. H. Johns, Westminster.—p. 170.
81 Common Head Colds. E. W. Carpenter, Greenville.—p. 172.
82 Some Popular Ideas About Insanity. R. L. Leak, Columbia.—p. 176.

Surgery, Gynecology and Obstetrics, Chicago

July, 1918, **27**, No. 1

83 Surgery of Double Kidney; Report of Case of Resection of Upper Segment for Calculous Pyonephrosis. H. H. Young and E. G. Davis, Baltimore.—p. 1.
84 Supernumerary and Single Ureters Opening Extravesically; Two Cases. E. S. Judd, Rochester, Minn.—p. 13.
85 Mixed Tumors of Salivary Glands. A. Fraser, New York.—p. 19.
86 *Cysts and Pseudocysts of Pancreas; Report of Cases. A. A. Kerr, Salt Lake City, Utah.—p. 40.
87 Congenital Ranula of Tongue Developed in Left Blandin-Nuhn Gland. R. T. Aguirre, Guatemala, Central America.—p. 45.
88 Globocellular Sarcoma of Right Testicle. Orchidectomy Under Local Anesthesia (Allen's Technic). R. T. Aguirre, Guatemala, Central America.—p. 47.
89 Present Status of Surgery of Bile Tract. A. D. Bevan, Chicago. —p. 49.
90 *Surgery of Posterior Spinal Roots; Results in Two Hundred and Forty-Four Operations. C. R. Steinke, Akron, Ohio.—p. 55.
91 Study of Fractures of Lower Extremity of Humerus. H. A. H. Bouman, Minneapolis.—p. 58.
92 *Mesenteric Vascular Occlusion; Three Cases. A. A. Eisenberg and H. A. Schlink, Cleveland.—p. 66.
93 *Dislocation of Spleen. J. Saliba, Elizabeth City, N. C.—p. 73.
94 Two-Stage Operation for Carcinoma of Pregnant Uterus Under Paravertebral Anesthesia. N. R. Mason and F. C. W. Konrad, Boston.—p. 75.
95 *Formaldehyd-Phenol in Camphor Paraffin. K. Connell, New York.—p. 81.
96 Essential Points in Method of Hernia Operation. A. B. Keyes, Chicago.—p. 85.
97 End-Result with Bone Plate on Fractured Femur. C. G. Swenson, Chicago.—p. 86.
98 *Cerebral Hernia; Method for Its Surgical Treatment. A. Schwyzer, St. Paul, Minn.—p. 87.
99 Blood Transfusion Simplified by Use of Citrate Ointment. H. W. Abelmann, Chicago.—p. 88.
100 Cesarean Section, Local Anesthesia. H. H. Trout, Roanoke, Va. —p. 95.
101 *Action of "Female Remedies" on Intact Uteri of Animals. J. D. Pilcher and R. T. Mauer, Omaha.—p. 97.

86. **Cysts and Pseudocysts of Pancreas.**—Kerr cites two cases. He says that pancreatic and pseudopancreatic cysts, while not rare, are of sufficient importance to be recorded. The roentgen ray is an important aid in diagnosis in showing the position of the cyst in relation to the stomach and other organs. The treatment is surgical, usually incision and drainage. Sometimes it is practical to remove the entire cyst in favorable cases. Diabetes is an occasional complication of pancreatic cysts, and when present renders the operation more dangerous, although one should not hesitate when less than 4 per cent. of sugar is present after giving a diabetic diet and a course of alkaline treatment to minimize the acidosis, to give even these the benefits of operations. An antidiabetic diet is advisable following operations on the pancreas, especially where the discharge is irritating. Paraffin ointments are serviceable to allay the irritation.

90. **Surgery of Posterior Spinal Roots.**—The work of forty-seven different operators is analyzed by Steinke so that no one man's technic can be accredited with the general good results. The amount of root resected varied from 3 mm. to 3 cm. In the spastic cases four were cured, fifty greatly improved, and forty-seven somewhat improved. In the tabetic cases fourteen were cured, and thirty-seven improved. Operation for pain gave seven cures, and nine improved out of thirty-nine cases. When one considers the gravity of the operation the mortality is not high. With these facts at hand, Steinke says, we may conclude that the operation of resection of the posterior spinal roots, when properly carried out, is one of great value to the patient and should be performed more frequently.

92. **Mesenteric Vascular Occlusion.**—Mesenteric vascular occlusion is not an extremely rare condition. Eisenberg and Schlink found about 400 cases recorded in the literature. The occlusion is most frequently in the arteries. By far the most common lesion produced is hemorrhagic infarction of the intestine. The most common cause of the occlusion is embolism resulting from infection and injury. There is no difference clinically between the arterial and the venous occlusion, regardless as to whether it is due to embolism or thrombosis, in the superior or the inferior vessels. The clinical diagnosis should be made on sudden onset, acute colic-like abdominal pain, distention and tenderness, signs of shock and collapse; often there may be vomiting and constipation; if diarrhea is present, it is almost always accompanied by melena. Three cases are reported.

93. **Dislocation of Spleen.**—Saliba reports a case of dislocation of spleen into the pelvis and its firm fixation into the uterus. The rational treatment of a dislocated spleen is splenopexy. This is true if the spleen is healthy, but a dislocated spleen is rarely a healthy one and, therefore, splenectomy is often the operation indicated. Taking into consideration the patient's physical and constitutional condition, Saliba did a hysteropexy and splenopexy fixing the uterus and the spleen to the abdominal wall. The patient made a good recovery. This case is said to be of interest because it is the first case on record where the spleen so shaped itself as to ride astride the fundus of the uterus. No hemorrhage occurred from the spleen when catgut stitches were inserted into its substances, at first, to control the oozing following the separation of the adhesions to the colon, and, secondly, to fix it to the abdominal wall. Saliba suggests that this might be due to a general increase of the fibrous tissue of the spleen, which could not be verified without a microscopic section.

95. **Formaldehyd-Phenol in Camphor Paraffin.**—The combination described by Connell was the result of a laboratory survey by new methods of the various clinically useful antiseptics. A preliminary trial of this antiseptic in the traumatic crushed wound of civil surgery at the Roosevelt Hospital, New York, has demonstrated that it is a powerful and efficient combination of time tried antiseptics. It combines the rapid sterilizing action of formaldehyd with the slow embalming action of phenol. The painful properties of the former antiseptic and the local and general toxicity of the latter agent are mitigated by dissolving them in an anhydrous, slowly spilling reservoir, namely, the camphor paraffin solvent. The purpose of this combination was to produce an antiseptic of high efficiency and lowered toxicity, which, when employed as the first major surgical dressing together with efficient drainage in the surgery of the advance dressing station, may possess such power of diffusion through organic matter and such permanency of bacterial inhibition that the crushed infected tissue of the war wounds may reach the service of the rear, well drained, without extending infection or local putrefaction. The ultimate product, therefore, to obtain the highest advantage physically and as an antiseptic was compounded as follows: *A*. To 70 parts by weight of pulverized camphor add 30 parts of phenol, liquefied by heat. A clear solution results. *B*. Next melt together paraffin of 52 C. melting point, about 3 parts, and paraffin oil 9 parts, adjusting the proportions until the mixture frosts on the bulb of a test thermometer at 40 C. Add 45 parts of *A* to 50 parts *B*. Obtain a solution freezing at 35 C. *C*. Prepare 10 per cent. of formaldehyd in alcohol. Most readily accomplished by adding formaldehyd solution to alcohol and dehydrating by desiccated sodium sulphate. To 9 parts of *A B* at 40 C. slowly add 5 parts of *C*. A clear solution of all ingredients results which freezes and melts at 36 C. Store in open mouth bottles with paraffined corks or pour directly into tightly wadded gauze packing for ultimate consumption.

Indications for use of formaldehyd-phenol in camphor paraffin. This preparation is to be used as the first major wound antiseptic in civil surgery and in the surgery of the advance dressing stations. It sterilizes and embalms crushed devitalized wounds for transportation or for long immobilization without redressing.

Method of application. Free surgical drainage should be established. Gauze saturated with the antiseptic should be applied as packing into all clefts and pockets. The interior of the wound should be packed firmly, but the drainage openings should be packed loosely. It should be spread as a sheet on all open wounds and covered with paraffined gauze. (On wounds for primary suture, it should be employed as is tincture of iodin.)

℞ by weight, formaldehyd, 0.5 per cent.; phenol, 13.5 per cent.; camphor, 31.5 per cent.; alcohol, 4.5 per cent.; paraffin, 52 C.; paraffin oil, 50 per cent.

98. **Cerebral Hernia.**—In one case cited Schwyzer made use of a bridge flap, including the external table, which was slid over the defect in the skull in the manner of a visor of a helmet. The dependably secured nutrition for the flap, the firm and steady pressure of the flap on the defect, the degree of which can be chosen by the greater or less width and obliquity of the pedicles of the bridge, and finally the hermetic bony closure of the defect are the outstanding benefits of this procedure.

101. **Action of Female Remedies on Intact Uteri of Animals.**—This paper concludes the study of the so-called female remedies (The Journal, Aug. 12, 1916, p. 490; *Arch. Int. Med.*, November, 1916, p. 557; December, 1916, p. 752). These experiments demonstrate conclusively that all the female remedies are quite void of action on the uterus in situ, thus confirming the interpretation of the results of the work on the excised uterus and intestine. They cannot, therefore, influence the tone or contractions of the uterus through any central innervation or through the blood stream, no matter whether the uterus is in a state of normal, increased or decreased tone. The following drugs were all found to be inactive in doses that were far above the average therapeutic dose: unicorn root, pulsatilla, Jamaica dogwood, figwort, valerian, lady's slipper, wild yam, life root, skull cap, blue cohosh, black haw (*Viburnum prunifolium*), cramp bark, squaw vine, false unicorn, passion flower and motherwort.

Tennessee State Medical Association Journal, Nashville

July, 1918, **11**, No. 3

102 Surgery of Thyroid. J. B. Haskins, Chattanooga.—p. 51.
103 Surgical Management of Chronic Gastric and Duodenal Ulcers. R. L. Sanders, Memphis.—p. 57.
104 Laryngeal Tuberculosis; Its Early Recognition and Curative Treatment. C. A. Robertson, Ridgetop.—p. 60.
105 New Treatment of Epithelioma. G. C. Savage, Nashville.—p. 66.
106 Physician's Duty and His Responsibility to Government in Crisis. F. D. Smythe, Memphis.—p. 74.
107 Induration of Corpora Cavernosa: Fibrous Cavernositis. P. Bromberg, Nashville.—p. 78.

Washington Medical Annals

July, 1918, **17**, No. 4

108 Hernia into Lesser Peritoneal Cavity Through Foramen of Winslow. I. S. Stone, Washington.—p. 249.
109 Care of Child Throughout Ages. J. A. Foote, Washington.—p. 251.
110 Case of Ovarian Tumor in Mulatto. I. S. Stone, Washington.—p. 253.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Children's Diseases, London

April-June, 1918, **15**, No. 172-174

1 *Cases of Urinary Disease in Children. R. Thompson.—p. 81.
2 *Erythema Nodosum Associated with Tuberculosis. E. Bronson.—p. 91.
3 Nature of Von Jaksch's Disease. G. Ward.—p. 101.
4 Smallpox in Childhood. H. W. L. Barlow.—p. 110.
5 Can Clinical Manifestations of Congenital Heart Disease Disappear with General Growth and Development of Patient? F. P. Weber.—p. 113.
6 Case of Erythema Iris. F. P. Weber.—p. 115.
7 Case of Hemophilia with Effusion into Knee Joints. P. B. Roth.—p. 116.
8 Pregnancy Occurring in Child Aged Fourteen Years. J. Burnet.—p. 119.
9 Infantile Kala-Azar in France. M. Labbé, Targhetta and Ameuille.—p. 120.
10 Epidemic of Familial Syphilis. E. Jeanselme and Chatelain.—p. 122.
11 Fifth Cusp and Hereditary Syphilis. C. Mantoux.—p. 123.

1. **Urinary Disease in Children.**—Cases of urinary disease in children are not so common as in adults. Thompson suggests that this is owing, perhaps, to the want of obstructive causes, such as enlarged prostate or pregnancy. Obstructive lesions, however, may occur following on tuberculous peritonitis and adenitis. Pyonephrosis may occur due to aberrant blood vessels, renal calculi, or fibrous adhesions kinking the ureter. Vesical calculus in children has a bad prognosis; a lithotrity should always be preceded by a cystoscopy. Traumatic stricture of the urethra has a bad outlook, and, if possible, should be excised and buried deeply.

2. **Erythema Nodosum Associated with Tuberculosis.**—Bronson cites a case of erythema nodosum in which a tuberculous pleural effusion supervened in a typical example of this eruption occurring in a boy, 9 years of age.

British Medical Journal, London

July 13, 1918, **2**, No. 3002

12 Future of Medical Profession. B. Dawson.—p. 23.
13 Clinical Organization of Profession from General Practitioner's Point of View. M. G. Biggs.—p. 26.
14 *Sympathetic Nervous System and Irritable Heart of Soldiers. F. Fraser and R. M. Wilson.—p. 27.
15 Psychoneurotic Factor in Irritable Heart of Soldiers. B. S. Oppenheimer and M. A. Rothschild.—p. 29.
16 Chemotherapy of Gonorrhea. J. E. R. McDonagh.—p. 31.
17 Treatment of Pregnant and Parturient Woman in Prevention of Maternal and Infantile Deaths: Neonatal Life—and Death. J. W. Ballantyne.—p. 32.
18 Maternity Hospital and Antenatal Centers. C. Berkeley.—p. 33.

14. **Sympathetic Nervous System and Irritable Heart of Soldiers.**—Patients with irritable heart and healthy subjects have been compared by Fraser and Wilson in respect to their reaction to epinephrin and apocodein. In the case of each drug minute doses produced a greater action in the patients than in the controls. It is concluded, therefore, that the sympathetic system of nerve fibers, using the term in its physiologic rather than in its anatomic sense, is relatively unstable in that it appears to be more susceptible to the stimulating and depressing influences, respectively, of these drugs.

Glasgow Medical Journal

May, 1918, **89**, No. 5

19 Uterine Fibroids, or Myomas of Uterus Complicating Pregnancy, Labor and Puerperium. W. D. Macfarlane.—p. 257.
20 Rickets in Its Relationship to Housing. L. Findlay.—p. 268.
21 Case of Hematemesis and Hyperpyrexia, Probably of Hysterical Origin. J. M. Melvin.—p. 276.

June, 1918, **89**, No. 6

22 Postmalarial Severe Anemia. A. W. Harrington and W. Whitelaw.—p. 321.
23 Soamin (Sodium Arsanilate) in Treatment of Bronchial Asthma. B. N. Ghosh.—p. 343.

Indian Medical Gazette, Calcutta

May, 1918, **53**, No. 5

24 Sodium Antimonyl Tartrate Vel Tartar Emetic in Kala-Azar. L. Rogers.—p. 161.
25 Rat Destruction as Means for Prevention of Plague. G. W. P. Dennys.—p. 164.
26 Hemoglobin Index and Other Factors in Newly Recruited Coolies to F. M. S. M. J. Fattray.—p. 168.
27 Metals Gold, Silver and Arsenic in Colloid State. T. C. Boyd. —p. 170.
28 Improved Technic for Detection of Hookworm Eggs. C. Lane. —p. 173.
29 Tetanus and Technic. A. Hooton.—p. 174.
30 Case of Bilharzia Infection (Imported from Mesopotamia, and Occurring in Civil Population at Karachi). D. F. Curjel.—p. 176.
31 Relapsing Fever. M. Ali.—p. 178.
32 Case of Gangosa at Alipore Jail. J. Roy.—p. 180.

Journal of Tropical Medicine and Hygiene, London

July 1, 1918, **21**, No. 13

33 Enteromonas Hominis and Protetramitus Testudinis. A. J. Chalmers and W. Pekkola.—p. 129.

Lancet, London

July 13, 1918, **2**, No. 4950

34 Modern Views on Diabetes. E. P. Poulton.—p. 31.
35 *Absence of Influenza Bacillus in Exudate from Upper Air Passages in Present Epidemic. T. R. Little, C. J. Garofalo and P. A. Williams.—p. 34.
36 *Some Unusual Forms of Epidemic Disease. A. K. Chalmers, R. M. F. Picken and A. MacLean.—p. 35.
37 Outbreak of Acute Febrile Disease in Three Factories and Industrial School in Glasgow. A. MacLean.—p. 36.
38 Clinical Study of Craniotabes. E. Hughes.—p. 36.
39 Nervous Sequelae of Cerebrospinal Fever. C. Worster-Drought. —p. 39.
40 *New Method of Preparing Gonococcus Antigen. D. Thomson. —p. 42.
41 *Quick Method of Diagnosing Type of Meningococcus in Cases of Cerebrospinal Fever. A. S. G. Bell and I. M. Harmer. —p. 43.
42 Loss of Complementing Power in Kept Serum. J. S. C. Douglas and J. W. Bigger.—p. 44.
43 Kala-Azar in Malta; Two Cases Treated by Intravenous Injection of Tartar Emetic. H. I. W. Kerr.—p. 45.
44 Technical Reeducation in Italy. E. Levi.—p. 53.

35. **B. Influenzae and Present Epidemic.**—The authors are of the opinion that although the epidemic now prevailing in Europe has been called influenza for the want of a better name, it cannot properly be considered such for the following reasons: 1. The clinical course, though similar to that of influenza, is of very short duration, and there is, so far as they have observed, an absence of relapses, recurrence or complications. 2. The present epidemic is not characterized by a sharp leukocytosis and polynucleosis, but rather by a very slight leukocytosis with a proportional lymphocytosis of the small mononuclear variety. 3. The organism of influenza, namely, *B. influenzae* was in all cases absent and there was present with no exception a gram-positive diplococcus.

36. **Unusual Forms of Epidemic Disease.**—A considerable number of cases were examined by Chalmers and others. In the cases investigated by Picken nervous symptoms were a predominant feature. In MacLean's inquiry the majority of the cases occurred among groups of workers in industrial establishments. All these cases were of a mild type, characterized by sudden onset, severe headache, prostration and rapid recovery, usually within two to four days. This group contained 420 persons and the symptoms suggested influenza. Excluding the influenza element, this disease appears to be an affection which attacks the central nervous system, alternately the brain or cord, and falls within the group of affections for which the name Heine-Medin (a combination of the names of two observers of outbreaks last century) has been adopted. Of these the form best known is where the cord is the chief seat of the disease (infantile paralysis or poliomyelitis), of which the outbreak in New York in 1916 is probably the most recent on a large scale. It is possible, as Picken suggests, that the form simulating "botulism," is an aberrant form of this, chiefly affecting the brain, and in some parts of France where it has been recently present it has been called "lethargic encephalitis" to distinguish it from the more commonly recognized affection of the cord and as possibly due to a separate cause. In any case it would appear to be an affection of the gray matter of the brain as distinct from disease of the corresponding portion of the cord.

The precise methods of spread are somewhat obscure. The occurrence of isolated cases has suggested the agency of insects, and the stable fly has come under suspicion. With regard to preventive measures, it would seem obvious that the best defense of the population against the spread of the disease lies in a rigid attention to the details of personal and domestic cleanliness, including vigorous action against vermin and insect pests of all sorts. The disease tends to increase during warm weather, and court and stair cleansing and the frequent removal of stable litter should be rigorously enforced.

40. **New Method of Preparing Gonococcus Antigen.**—The serum to be tested is inactivated by heating to 55 C. for ten minutes in a water bath before dilution. The complement should be titrated against the stock antigen diluted 1 in 10 with 0.85 per cent. saline as used in the test. To twelve Wassermann tubes add 0.1 c.c. of guinea-pig serum complement diluted from ten to 120 times. To each add 0.1 c.c. of the diluted antigen (1 in 10) and 0.1 c.c. of saline. Shake the tubes and place the tray in the ice-chest for one hour. Then put tray in water bath at 37 C. for half an hour. Add to each tube 0.1 c.c. of fully sensitized sheep's corpuscles (3 per cent. suspension). Replace tray in water bath at 37 C. and take the readings after fifteen minutes. The highest dilution of complement which produces complete hemolysis should be taken as 1 minimum hemolytic dose. The test: Three tubes, A, B and C, are employed. (*a*) To A and B add 0.1 c.c. (at a dilution of 1 in 20) of the inactivated serum to be tested. To C add 0.1 c.c. of normal saline. (*b*) To A add complement 0.1 c.c. containing 3 minimum hemolytic doses. To B add complement 0.1 c.c. containing 2 minimum hemolytic doses. To C add complement 0.1 c.c. containing 2 minimum hemolytic doses. (*c*) To A, B and C add 0.1 c.c. compound antigen (diluted 1 in 10). Tube C acts as the control. (*d*) Place the tubes in the ice-chest over

night and next morning add to each 0.1 c.c. of a 3 per cent. emulsion of fully sensitized corpuscles. Then place the tubes in the water bath at 37 C. and take the reading after fifteen minutes. The control tube C should show complete hemolysis. Hemolysis in A and B indicates a negative reaction. No hemolysis in A and B indicates a strong positive. No hemolysis in B alone indicates a weak positive.

41. **Meningococcus in Cerebrospinal Fever.**—An antigen is made by dissolving all cocci in twentieth normal sodium hydroxid and bringing the solution back almost to the neutral point by the addition of twentieth-normal hydrochloric acid. This antigen is used in a dilution equivalent to 100 million cocci per c.c. The patient's serum is tested in dilutions of 1:50, 1:100 and 1:200. It is found to be advisable to use all three dilutions for each test, as the readings are not sufficiently clean cut for a single dilution only to be used. A sheep hemolytic system is used and complement is obtained from the ear of a guinea-pig. In the titration of the complement the following method is followed: Increasing doses of a 1:10 solution of complement, namely, 0.15 c.c., 0.2 c.c., 0.25 c.c., etc., are added to tubes already containing antigen and 1:50 normal human serum in the proportions subsequently used in the actual test. These are incubated in the 37 C. water bath for half an hour before the hemolytic couple is added. The exact amount of complement required to bring about complete hemolysis under these conditions is then used in the test proper. A control is put up of the serum of the patient without the antigen and a further control of the antigens only.

Practitioner, London

July, 1918, **101**, No. 1

45 *Investigation of Four Hundred and Sixty-Three Cases of Supposed Dysentery; Treatment of Some with Emetin Adsorption Product. R. Donaldson, A. B. Clark and R. C. McLean.—p. 1.
46 Review of Recent Liteature on Diseases of Heart. C. W. Chapman.—p. 11.
47 *Heart Reserve in Military Training. A. Johnson.—p. 21.
48 Review of Recent Literature on Urinary Surgery. J. W. T. Walker.—p. 23.
49 Malignant Chorionepithelioma in Male. Fatal Intraperitoneal Hemorrhage from Rupture of Metastatic Growth in Liver. F. P. Weber.—p. 31.
50 Some Uncommon Causes of Pelvic Hemorrhage in Women. G. Taylor.—p. 37.
51 An Unorthodox View of Diseases of Appendix. J. C. Barker.—p. 40.
52 *Value of Early Lumbar Puncture in Meningism. A. S. Gillett.—p. 49.

45. **Dysentery Treated with Emetin Adsorption Product.**—From a study of the type of case dealt with in this paper, it would appear that while three examinations of the excreta will probably detect about 95 per cent. of carriers among those convalescent from bacillary dysentery, at least five examinations ought to be made in the case of persons suspected of having had dysentery. It is important to bear in mind that the urine may be a possible source of infection. In the search for protozoal cysts Donaldson and his associates recommend the double stain process in preference to the simple iodin method, in order to minimize the risk of missing positive cases, especially when the infection is a light one. As regards treatment, while exact data concerning the amount of emetin given abroad subcutaneously are wanting, the results, judging from the cases examined, appear to indicate comparative inefficacy of that form of administration. Two preparations have been used in treatment, namely, emetin bismuthous iodid and an emetin adsorption product. These appear to be of equal potency as regards rendering the stools negative, and superior to emetin given subcutaneously. B. E. I., however, is handicapped by reason of its disturbing effect on the patient, and, in the authors' opinion is inferior in this respect to the emetin adsorption product which, for the most part, can easily be tolerated. As their cases appear to show that not more than 50 to 60 per cent. may be regarded as possible cures after one course of twelve doses. Donaldson and his co-workers urge that the minimum course of twelve doses should be increased. As the unfortunate concomitant effects of B. E. I. preclude its prolonged use, they recommend that the emetin adsorption product should be used in its place as a routine treatment.

47. **Heart Reserve in Military Training.**—Johnson concurs that in carrying out a scheme for finding the limitations of heart reserve standard and varying physical strains would be necessary for the test. Marching progressive distances, parades, physical exercise to pick out the weaklings and, for those who showed ability for severe strains, doubling on the level and uphill. Therefore, he suggests that an old but reliable test might be applied: that of taking the pulse rate before the test, allowing three minutes to elapse, or for the more severe strains five minutes after the test, and then timing the pulse rate again. If, after comparing the results, it is found that the pulse rate is accelerated, this man is doing too much; repetition will only lead to further dilatation of his heart, and he should be put to training involving less strain. The test for any but those who have managed the severest tests should be applied at intervals of from one week to one month, according to the requirements of the case. Thus, each man would be trained according to his capabilities, and there would be no opportunity of deceit or fraud on the part of the man under observation. A method such as this would not throw much extra work on the medical department, but would rather turn their energies from dealing with men broken with bad training to the prevention of crowding the hospitals and the everlasting "Attend B." (or no duty). Medical orderlies could easily be instructed in timing the pulse accurately, and referring those who failed in physical test to the medical officer.

52. **Diagnosis of Meningism.**—Gillett analyzes sixty-five cases. Rash was absent in forty-eight; ten showed a diffuse scarlatiniform rash, observed between the seventh and twelfth days of disease. Petechial hemorrhage was apparent in three, one being very profuse. Four cases presented a papular rash within the first five days, the earliest observed being on the first day of disease. The pulse was extremely variable, no two cases being alike; increased in fifty-eight and keeping about normal (70 to 90) in the remaining seven cases. Features common to all were irregularity and variability, the frequency rarely being as high as the temperature would lead one to expect. An irregular, quickly variable pulse is nearly always present when the disease has obtained a firm foothold. In the majority of cases (fifty) the temperature rose suddenly to a height varying from 101 to 105. In eleven cases the rise was more gradual, taking from eight to sixteen hours to register above 100, and four cases were entirely afebrile. Headache was always present, but only in twenty-three cases was it definitely allocated to the occipital region, the remainder showing a general ache all over the head of a severe and, in a few cases, unbearable nature.

The general appearances in the majority of patients was typical: A flushed face of a slightly dusky tinge, and an extremely worried and anxious expression, coupled with dulness and apathy. General malaise and, in a few cases, a very definite nasopharyngeal catarrh, such as precedes measles. Vomiting was absent in thirty-two cases. Herpes, when present, always affected the lips, but fifty-two cases showed no sign at all of this affection. The pupils: Two main features were noticed in all cases as being constant: (1) dilatation generally equal, sometimes unequal; (2) reaction to light, always sluggish. Strabismus was absent in fifty-six cases; nystagmus, absent in fifty cases; ptosis, absent in fifty-five cases; conjunctivitis, absent in fifty-five cases; suppurative choroiditis was present in three cases. The knee jerks were absent in sixteen cases; Babinsky, present in twenty-three cases; abdominal reflexes absent from the first in fifty-six cases. A leukocytosis was present in all cases. The counts varied from 28,000 to 32,000.

Stiffness of the neck: This sign was of the utmost value. In no single case was the stiffness absent, varying naturally in amount from the severe type—giving later the true retraction of the head and perhaps opisthotonos—to the milder cases with comparatively slight stiffness, increased when the head is flexed. Definite retraction was observed in forty-two cases, but it was not a decided feature until a date varying from two to five days after the onset of the disease. Kernig's sign, too, was almost equally constant, there being only three

cases in which it was not present from the first. The sign was bilateral in fifty-eight out of the sixty-five cases. These details make it quite evident that, apart from stiffness of the neck, no data whatever can, in the early stages, justify dogmatic diagnosis. A more constant clinical aid is lumbar puncture, and its resulting bacteriologic investigation. Gillett urges that lumbar puncture should be performed at the earliest moment and not, as is often the case, only when the condition has become markedly indicative of meningeal irritation. It can do no possible harm; and, on the other hand, the value of such a procedure is incalculable. He suggests that this course be adopted more frequently in patients presenting a fever of uncertain origin, manifesting the general appearance and condition as noted above.

Archives Médicales Belges, Paris

December, 1917, **70,** No. 12

53 *Eye Symptoms with Spirochete Jaundice. Moret.—p. 1105.
54 Present Treatment of Syphilis. B. Dujardin.—p. 1116.
55 *Vocational Training of the Maimed. R. Van Roy.—p. 1133.
56 *Localization of Pulmonary Tuberculosis. A. de Marneffe.—p. 1139.
57 Strangulated Hernia of the Lung. P. Van Reeth, J. Voncken and M. Stassen.—p. 1142.

53. **Ocular Disturbance with Spirochetosis Icterohemorrhagiae.**—Moret found disturbances on the part of the eyes in all the severer cases among the seventy-two patients with spirochete jaundice in his service at the Belgian military hospital at Bourbourg, to which all the jaundice cases in the Belgian forces were sent. During the acute phase, the tendency to congestions involves the membranes of the eyes, with sometimes hyperemia of the deep membranes. This seems to be due to disturbance in the suprarenal control of the blood vessels, not to an inflammatory process in the eye. There may be hemorrhages in the eye membranes. The spirochete has been known to settle in the iris and induce iritis. During the stage of anemia the eye may show the changes liable with any severe anemia.

55. **Vocational Training of the Wounded.**—Van Roy discusses the measures to be taken when there is a chance that the man disabled by crippling can regain functional control of his wounded limb so that he can return to active or limited service. This functional restoration should be aimed at from the very first, and measures to realize it should accompany the physiotherapy without any interval. Institutions devoted to those capable of recuperation should not waste time on the severely wounded, who require vocational training. Dr. Hullin, in charge of the medical department of a Belgian accident insurance company, sets the injured man to work again at his trade at the earliest possible moment, having him work mornings only, and spend the afternoon at the institute for physiotherapy, but paying him the full sick benefit all the time. Van Roy exclaims "How many cases of cicatricial retraction and contracture might have been avoided if, instead of keeping the men in the hospitals, convalescent homes, etc., they had been invalided on 'convalescence leave' not to loaf, but on 'leave for compulsory work,' compelling them to work at their old trade for a specified part of the time." This not only benefits the man, but would help to relieve the scarcity of man power. When the wound is such that full recuperation is out of the question, garden or field work is the best all-around preparation for vocational training. Convalescents do not belong in city institutions; gardens and fields are indispensable. The tendency in the hospitals to keep the wounded until they are fully restored, should be vigorously combated. In the hospital, the wounded man takes much longer to recuperate his physical strength, his resilience and his endurance, while the interests of the country suffer.

When the maiming is such as to render full recuperation out of the question, the aim should be all for after-the-war. It is advisable, he reiterates, to adapt the man to resume his old trade rather than to train him in a new one. He learns better and quicker, and he has a better chance to get along among his old friends and mates. In short, vocational training of the wounded differs as it is for army or civil life, for functional restoration, for physical reeducation, or for vocational training of those absolutely unable to work at their former trade. He has seen men whose legs had been amputated who had successfully returned to their trade as a baker.

56. **Localization of Pulmonary Tuberculosis.**—De Marneffe recalls that every time the muscles of the arm contract forcibly, the respiration is modified. The respiratory expansion of the chest, corresponding to the group of muscles involved, grows less during the moment of their strong contraction. The effect is felt most in the apex region of the chest on that side. This checking of the expansion of the chest can be observed with whole series of the ordinary movements of life, at table or horseback, in school and workshop. The right hand is employed for all vigorous movements, and the right apex thus feels their effect first and foremost. The violinist, on the other hand, grasps his violin with the left hand, and the muscular effort to hold the violin firm is felt by the left apex. Marneffe advances this theory to explain the localization of pulmonary tuberculosis, adding that by avoiding the special muscular efforts which tend to check the expansion of the chest on that side, we aid in warding off tuberculosis. Exercises which at the same time lift the clavicle and the first ribs, avoid this deleterious influence. Among the exercises of this kind are the raising of the hands to the clavicles, to the back of the neck, vertically above the head, etc.

Correspondenz-Blatt für Schweizer Aerzte, Basel

June 8, 1918, **48,** No. 23

58 *Compulsory Insurance against Accident and Sickness in Switzerland. H. Zangger.—p. 753. Concluded in No. 24, p. 796.
59 *Accident Insurance and Ophthalmology. Vogt.—p. 762.
60 *Prophylaxis of Venereal Diseases. Bloch.—p. 768.
61 *Pneumothorax from Injury while Blocking Nerve. A. Vischer.—p. 772.

58. **Connection Between Accident and Disease.**—This article was the closing lecture of Zangger's course on the medical features of the new accident insurance legislation in Switzerland. He emphasizes the special points of difference in the medical aspect of the case, between single private insurance and collective compulsory insurance. Knowledge of the accident process, that is, of the etiology of the disturbances noted, is all important. If a fracture occurs from a comparatively slight force, we can assume some special cause in the body, and the prognosis is modified thereby, as we seek to discover the predisposing cause. He reiterates the importance of the first examination, determination of the causal connection, for the insured know well that if they can once convince the physician, mislead him from the start, it is practically impossible for their malingering to be detected later, because the true causal connection then can no longer be determined, and also because the courts depend so implicitly on the findings at the first examination. No matter what other reports may be made later, the courts depend on the first report. If concussion of the brain, for example, is specified in the first report, nothing that can be said later will convince the judge that there had been no concussion. Many insured workmen plot how to get the physician to accept a *Kausalzusammenhang,* and physicians must be on their guard against being exploited in this way. By uncovering these would-be malingerers they also serve the state.

Zangger has encountered one case in which thirty different physicians had taken the patient's statements at their face value, and had certified to severe injuries from insignificant accidents, so that the man had been paid "compensation" at least twelve times by different railroads and tram lines. The first report should include specification of the present status from the standpoints of etiology, prognosis and treatment, with the data on preexisting disease which introduced, occasioned or modified the accident. This includes the known affections, which might be concealed, the visible, which cannot be concealed, and the unknown affections, that is, those whose symptoms the patient misinterprets unconsciously or wilfully, or which had caused no symptoms until the accident, such as cerebral hemorrhage, perforation of the stomach, etc.

The Swiss legislation goes beyond any other in the world in accepting certain morbid conditions without visible manifestations as accidents entitling to compensation. This includes industrial poisoning from chronically acting poisons, such as is becoming more and more common during the war.

A causal connection seems more probable when several in the same factory present an acute disturbance, with little or no fever, and look badly, with discoloration of the skin. The physician must draw on his knowledge of medicine, toxicology, hygiene and natural science to aid in discovering the cause, as the workman himself very seldom knows what is inducing the trouble, and may mislead the physician with honestly meant but erroneous deductions—workingmen usually regard as poisonous only substances that smell badly or induce nausea. Several poisonous substances may have acted together, thus masking the symptoms from each. Elderly persons, children and the young, and those with cardiovascular disease may react to a poison in an entirely different manner from men in the prime of life. Nowhere else is the correct diagnosis so important for prophylaxis as with industrial poisoning. Sickness which is exclusively or predominantly traceable to a toxic acting substance ranks with industrial accidents in the Swiss law. Anthrax and glanders, on the other hand, have been dropped from the list for the present, but yellow fever, malaria, typhus and relapsing fever, befalling Swiss workingmen in the employ of a Swiss firm anywhere are regarded as entitling to insurance benefit, as they are the result of insect bites. Some of the private insurance companies have already paid indemnities to policy holders who had contracted typhus during the war.

In concluding this comprehensive study of ways and means to discover the causal connection in the insurance sense, Zangger warns of the danger of crime and suicide being managed so as to present the evidence of an accident entitling to insurance money. He relates instances in which the criminals were actually being paid by the state for their crime, as when a woman caused the death of her husband by closing the damper in the stove. In several such cases, some casual circumstance first suggested suspicion, not the physician's report. The physician had accepted matters as he had found them on the surface. The identity of the corpse must be verified, as otherwise the indemnity might be paid for some policyholder who had merely left the country. He has had occasion to examine eight cadavers in which death occurred in an epileptic seizure. The mouth and nose in one case were plugged with the wet sand in which the body was lying, and the tongue had been bitten, but the family denied that the man was an epileptic. Inquiry in his home town in Italy revealed that he had long been subject to epilepsy. In conclusion, Zangger reiterates that the Swiss social insurance is on a more comprehensive scale than in any other country. It places great authority in the hands of physicians, and its success depends on them and especially on their report at the first examination.

59. **Accident Insurance and Ophthalmology.**—Vogt discusses the injuries of the eyes of the insured which the general practitioner can treat, and those for which specialist treatment from the first is imperative.

60. **The Swiss Preventive Society.**—Bloch states that the present aim of the newly founded Swiss Preventive Society is propaganda and enlightenment of the public. The time is not yet ripe for placing the venereal diseases where they belong, namely, on the list of communicable diseases requiring compulsory notification. This, he says, is *Zukunftsmusik*, but in fact syphilis and gonorrhea are endemic diseases such as leprosy and smallpox once were, and they can be eradicated only by applying the same measures as have proved effectual with leprosy and smallpox. This would have been done long ago if it had not been for the fact that syphilis and gonorrhea have been exclusively labeled venereal, sexual diseases, burdened with the stigma of all the prejudices of centuries in regard to sexual life. Under the stress of war, the views on this subject have been materially modified in the last year or two in the belligerent countries, and the propaganda of preventive societies may modify public opinion along the same lines elsewhere.

61. **Pneumothorax from Injury while Blocking the Brachial Plexus.**—Vischer reports what he thinks is the second case on record of fatal pneumothorax from injury of the apex of the lung in anesthetizing the brachial plexus. The patient was a woman of 61, and the accident occurred while blocking the plexus preliminary to removing the breast, the seat of malignant disease. There was no disturbance from it at first, but symytoms of pneumothorax became apparent the second night, with death the fifth night. The injury of the lung was merely a prick, as was determined at necropsy. The needle introducing the anesthetic to block the plexus had punctured the left lung. Schepelmann reported a similar case in 1915 in which the threatening symptoms were arrested by introducing a trocar, into the pleura, over the outer end of which a rubber cot was tied. A slit in the rubber allowed expiration of air while the collapse of the rubber during inspiration closed the slit. The condition rapidly improved after three or four days. In introducing the needle to block the plexus, if the first rib is missed, the needle strikes the lung close to the plexus. The two cases related show that even the finest prick may be enough to induce fatal pneumothorax. Tracheal stenosis from a goiter may have contributed to the fatal outcome in this case, the inspiratory stridor hindering the closure of the minute opening, and also masking the symptoms from the pneumothorax. It is possible that an evacuating puncture might have saved the patient if the pneumothorax had been diagnosed earlier. The woman's heart was too weak to stand the strain.

Riforma Medica, Naples

June 15, 1918, **34**, No. 24

62 *Food Requirements. F. Bottazzi.—p. 461.
63 *Malaria. R. Secchi.—p. 466.
64 Botryomycosis in Man. E. Aievoli.—p. 469.
65 Necessity for Compulsory Course on Ear, Nose and Throat in Medical Curriculum. G. Gradenigo.—p. 476.
66 *Compulsory Insurance against Sickness. G. Cristalli.—p. 477.

62. **Food Requirements.**—Bottazzi protests against the tendency displayed by some recent writers to estimate at a lower figure the number of calories and the proportion of protein regarded as necessary for the soldier's ration. At the beginning of the war, the Italian soldiers' ration represented 3,013 and 4,182 calories, but this was soon reduced, and at one time it consisted only of 2,380 and 2,700 net calories. It has been increased since, but the calory value of the ration at present has not been made public. It probably does not reach the 3,000 and 3,600 net calories which the recent Inter-Allied Food Conference accepted unanimously as the standard ration for all the allied forces. The proportion of fat was accepted as 75 gm., or 100 gm. for the soldier on active service. Bottazzi reiterates that Chittenden was suffering from chronic rheumatism, and his conclusions should not be applied to healthy men. Bottazzi approves of reducing the meat ration for civilians, as they can make up the protein in other ways, and, in any event, the sacrifices should be made by civilians rather than by the soldiers.

"The navy has also been suffering from the application to them of Chittenden's estimates—forcing the sailors to eat according to what a man with chronic rheumatism and gout found to suit him best." Bottazzi protests further against the assumption that the men in the navy do not do as much work as the men in the army and hence do not need so much food. The passive and active movements on shipboard, the wind, the sea air, the sunshine, etc., intensify the metabolism and stimulate the appetite, to say nothing of the muscular exercise required in the care of the ship, etc. He cites a leading physiologist's statement to the effect that the ration in the Italian army, "as a result of action based on Chittenden's conclusions, was cut down in February, 1917, from 3,435 to 3,036 calories, a wholly insufficient amount for men on active service. It is impossible to avoid the conclusion that this under-feeding played a considerable part in the recent unfortunate events in Italy."

63. **Malaria.**—Secchi relates some experiences which show that men from nonmalarial districts were more susceptible to malaria when sent into a malarial country, than men from districts where malaria is more or less prevalent, but none were immune. He has been successful in treating malaria by giving quinin, 1.6 or 1.8 gm. of the bisulphate or 1.5 gm. of the hydrochlorid by the mouth seven hours before the time of the anticipated attack. This amount of the quinin is taken in three doses in the course of an hour and a half. This is repeated daily for six or eight days; then it is suspended for

five days, and then resumed for three consecutive days, and suspended again for five and so on for two months. Fowler's solution is given at the same time, from 4 to 20 drops a day. In cases with daily malarial attacks he gives the quinin at the time of the lowest temperature, both by the mouth and subcutaneously, remembering that the drug reaches its highest concentration in the blood in six or seven hours when given by subcutaneous injection. The results with this technic, he says, have been *insuperabilmente eccellenti*. Over 2,500 men with malaria have been treated in his service since June, 1915, and there was hemoglobinuria from intolerance in only two cases.

66. **Compulsory Insurance Against Sickness.**—Cristalli is an advocate of compulsory insurance of every one against sickness, with a fixed salary for the attending physicians, under civil service rules.

Anales de la Facultad de Medicina, Lima

May-June, 1918, **1**, No. 3

67 *Tumors in Mediastinum. E. Odriozola.—p. 203.
68 *Forensic Medicine in Peru. L. Avendaño.—p. 210.
69 The Various Functional Kidney Tests. M. A. Velasquez.—p. 234.
70 Nosography of Tropical Medicine. J. Arce.—p. 240.
71 *Psychotherapy. H. Valdizan.—p. 250.
72 Protozoon Found in Peruvian Lizard. E. Escomel.—p. 272.

67. **Tumor in Mediastinum.**—The experiences related by Odriozola teach the necessity for specific treatment as for syphilis whenever there are signs of a tumor in the mediastinum. This should be done even when radioscopy shows merely a nonpulsating tumor. The remarkable cures that follow when syphilis is a factor justify tentative treatment in all cases when pain, spasmodic cough, fatigue, difficulty in swallowing and supplementary venous circulation show compression by an encroaching tumor or mediastinitis.

68. **Forensic Medicine in Peru.**—Avendaño remarks that the teaching of legal medicine now enters on a new era in Peru with the completion of the new model morgue at Lima. He pleads to have this made the basis for an official institute of legal medicine. There is none to date in South America. He reviews the history of forensic medicine in Peru, which dates officially only from the beginning of the nineteenth century.

71. **Psychotherapy by the Nonspecialist.**—Valdizan comments that medicine began in prehistoric days as psychotherapy. "Ancient medicine was intuitively psychotherapic, and contemporaneous medicine is scientifically psychotherapic." The physician must strive in every way to maintain and enhance the patient's confidence in him, not for egotistic benefit but for the direct benefit of the patient. He warns that the physician should not depreciate his services or ascribe the success to Nature. It is better for the patient to have exaggerated confidence in the physician's skill, and ascribe his recovery to this alone. If the physician deprecates this excessive tribute to his skill, he can rectify the matter in speaking to the friends or family of the patient, but with the patient himself he should seek in every way to maintain the confidence and hope which are the precious product of a harmless error.

The listening to the patient's account of his sickness is a vital factor in winning his confidence. In the examination the physician should never let the patient see by his expression the emotions induced by the lesions encountered, as the patient is watching every gesture and expression. The diagnosis should never be said over the patient in making hospital rounds with visitors. In conclusion Valdizan reiterates that extrapsychiatric psychotherapy has triumphed in surgery even more brilliantly than in medicine, especially the results of Crile's research which marks an era in the annals of surgery, although the principle itself is nothing new.

Anales de la Facultad de Medicina, Montevideo

March-May, 1918, **3**, No. 1-2

73 *Gastro-Intestinal Disease in Infants. L. Morquio.—p. 1. To be continued.
74 Valvular Incompetency. P. E. Nuñez.—p. 126.
75 Associated Friedreich's and Pott's Diseases? A. Carrau and J. C. M. Fournier.—p. 138.
76 Capillary Ureometer for the Blood. P. Bonavia.—p. 150.
77 The Sodium Chlorid in Wassermann Test. A. Prunell.—p. 155.

73. **Gastro-Intestinal Disturbance in Infants.**—In this 125-page instalment of his serial comprehensive study of infant pathology, Morquio discusses the treatment for the different types of bowel derangement according as they are purely functional, or of dyspeptic, toxic-infectious or nutritional origin. He says of buttermilk that it has been used extensively in his service and that although the first enthusiasm has been much diminished, yet it is regarded as useful for certain indications, to supplement breast feeding, and in treatment of gastro-intestinal derangement, acute or chronic. A few children had to be kept on buttermilk exclusively all summer, as this was the only food on which they thrived. The older infants do not like the taste, and it had to be well sweetened for them at times. Fever on taking the buttermilk can usually be traced to an exacerbation of the toxic or infectious phenomena; the buttermilk is not responsible for it.

Archivos Españoles de Pediatria, Madrid

April, 1918, **2**, No. 6

78 *Fourth Disease. C. Aguilar.—p. 193.
79 *Thymus Death. J. Palancar and L. R. de Arcaute.—p. 208.
80 *Physiologic Value of the Tonsils. E. Prada.—p. 242.

78. **Fourth Disease.**—Aguilar presents arguments to show that the so-called fourth disease cannot be regarded as a morbid entity.

79. **Thymus Death.**—Palancar and Arcaute declare that microscopic findings are more conclusive as testimony than the mere size and shape of the thymus, in cases of sudden death for which the thymus seems to be responsible. In one of their two cases the thymus of the 4 months child weighed 28 gm. Except for a convulsion at 2 months, the child seemed healthy and the parents were young and healthy. The microscope showed indications of intense functional activity and proliferation. Another child in the family had died suddenly at the eleventh month, but the thymus was not investigated in this case. Their conclusion is that the thymus in certain cases may exert a toxic influence independent of any mechanical action. With hyperplasia of the thymus there may be perverted functioning, which may entail the gravest accidents. In their cases the lymphatic system seemed to be otherwise normal. This suggests that there is not the connection between the thymus and the lymphatic apparatus which some assume. Children have been born with hyperplasia of the thymus but the writers know of no instance of congenital hyperplasia of the lymphatic system. Probably the mechanism is not always the same in the cases of sudden thymus death, toxic factors in some and mechanical factors intervening in others. Perverted functioning of the thymus is most common and most evident in infants under the age of 16 months. The toxic action seems to be most injurious for the cardiovascular system. The microscopic findings in the case mentioned showed a remarkable number of subpericardial and subcapsular ecchymoses, one apparently in every terminal arteriole. The microscopic findings are illustrated and the literature on thymus death is analyzed.

80. **Tonsils in Childhood.**—Prada found the hemoglobin percentage very much higher after the tonsils had been removed, in his examination of thirty children before and after tonsillectomy. The better respiration and oxygenation of the blood after the enlarged tonsils had been removed amply explain this improvement in the blood. Tests by Abderhalden's technic, as to defensive ferments, confirmed the apparently insignificant rôle played by the tonsils in the organism of children, so far as our present means of research can determine. He advises tonsillectomy when the child is inclined to deafness, and also when the child has had diphtheria, as the tonsils are liable to harbor the bacilli long, as well as when the tonsils are subject to recurring inflammation or merely obstruct respiration.

Brazil-Medico, Rio de Janeiro

May 4, 1918, **32**, No. 18

81 Nematode Cucullanus Pulcherrimus. N. sp. A. L. de B. Barreto.—p. 137.
82 *Syphilis of the Liver. A. Pedro.—p. 138.

May 11, 1918, **32**, No. 19

83 *Superficial Epitheliomas. C. De Rezende.—p. 145.

82. **Syphilis of the Liver.**—The data presented show that in the first of Pedro's two cases, the syphilitic origin was evident, although the clinical picture was that of a typical case of Laennec's cirrhosis. Under treatment for the syphilis, the liver returned to clinically normal and there has been no further disturbance during the seven years since. In the other case, there was nothing to suggest syphilis and the diagnosis of cancer of the liver seemed certain, particularly as there was extreme cachexia. As a last resort, treatment for syphilis was tentatively instituted and the whole picture of the syphilitic hypertrophic hepatitis with chronic jaundice promptly subsided, and has shown no signs of recurrence during the five years to date. The diagnosis was made solely on the result of the treatment; in two months complete health had apparently been regained.

83. **Superficial Epitheliomas.**—De Rezende calls attention anew to the excellent results he has obtained in treatment of epitheliomas of the skin with a salve which penetrates rapidly into the tissues and requires no dressing to hold it in place. In five cases in the last three years the epithelioma of from three to six years' standing was completely cured with one or two applications a week, first removing crusts and dead tissue, and suspending the applications if the tissues around become inflamed. Illustrations are given of some of the cases. The formula calls for 0.20 gm. each of arsenious acid, copper sulphate, methylene blue and methyl violet; with 0.50 gm. quinin hydrochlorid; 0.75 gm. tartar emetic, and 1 gm. each of camphor, menthol, phenol and antipyrin. The last four ingredients are mixed together first. They deliquesce and form the vehicle for the other ingredients which are added in turn, leaving the methylene blue and methyl violet till the last. He describes the special function expected of each these ingredients.

Medicina Ibera, Madrid

April 13, 1918, **3,** No. 23

84 Exopthalmic Goiter. S. A. Echevarria and J. Blanc.—p. 29. Commenced in No. 22, p. 6.
85 Iodin in Therapeutics. S. Alvarez.—p. 31.
86 Importance of Early Diagnosis of Contracted Pelvis. D. G. Puente.—p. 36.

Siglo Medico, Madrid

May 18, 1918, **65,** No. 3362

87 *Trauma of the Urinary Apparatus in Relation to Workmen's Compensation. S. Pascual.—p. 384.

May 25, 1918, **65,** No. 3363

88 *Alimentary Disturbances in Infants. B. H. Briz.—p. 401.
89 *Vacuum Extraction of Cataract. B. Castresana.—p. 403. Commenced in No. 3362, p. 382.
90 *Retrovesical Echinococcus Cysts. A. Martin.—p. 406.
91 Differential Diagnosis of Tuberous Acne of the Nostril and Syphilids. Sicilia.—p. 407.

87. **Trauma of the Kidney.**—Pascual discusses two cases in which contusion of the kidney region was followed by nephritis, transient in one case and chronic in the other. In the transient case there is still some pain and tenderness in the region but nothing to suggest kidney disease otherwise, the urine findings being normal. The only thing to be done in such a case is to keep the patient under observation and examine him anew from time to time. Catheterization of the ureters is not called for merely by the slight painfulness in these workmen's compensation cases. Actual chronic nephritis can scarcely develop after a contusion of the region unless the kidney was already damaged at the time. Even if albuminuria and certain disturbance in the urinary secretion persist for years, this does not constitute actual Bright's disease. It is impossible, he says, to lay down any laws; each case has to be studied for itself, with minute and repeated examination to determine that the nephritis is not transient. The French evaluate the incapacity from unilateral kidney disease at 25 per cent. and bilateral at 50 per cent. This is too schematic, he declares, but it affords a basis on which the individual case can be estimated.

88. **Gastro-Intestinal Disturbance in Infants.**—Briz reiterates that breast milk contains ferments, antitoxins, alexins and agglutinins. On other milk the child is liable to have all its functions disturbed until it reaches an extreme degree of malnutrition although it may seem to be doing well at first. In one case a young mother gave her child the breast for ten minutes, watch in hand, following some one's advice. The child was unable to get enough in the ten minutes, and it was suffering from undernourishment, while the breast did not get enough work to maintain the lacteal secretion. In cases of extreme athrepsia, or decomposition, nothing but breast milk will answer. He has witnessed a number of actual resurrections when the child seemed moribund, as soon as it was given good breast milk, very little at a time at first. He supplemented this with a daily injection of 20 c.c. of sea water or a mixture of 8 parts sodium chlorid and 10 parts sodium sulphate in 1,000 parts water, with a few drops of epinephrin solution. Along with this he gave hot brine baths.

89. **Vacuum Extraction of Cataract.**—Castresana describes his comparatively extensive experience with Barraquer's pneumatic method of extracting cataract in the capsule. (It was described in these columns, Dec. 8, 1917, p. 2006.) Its great advantages are that the method can be applied without waiting for the cataract to ripen; there is no chance for secondary cataract to develop, while the procedure is gentle and effectual. The drawbacks are only that the opening has to be made a little larger than with other technics as the drawing out of the aspirating cup plus the cataract entire takes up room. Iridectomy he found indispensable to avoid injury of the iris in drawing out the cataract. So far as loss of vitreous is concerned, he could not see that this vacuum method had any advantage over the older technics, although others claim that there is less danger of this.

90. **Retrovesical Echinococcus Cysts.**—Martin reports a case of retrovesical cyst in a boy of 13 which he treated by aspiration of the fluid contents of the cyst through the rectal wall, followed by injection into the cyst of Van Swieten's solution. Very little of the antiseptic is necessary; the conditions for success are that the parasite is alive, and that the fluid can reach it by diffusion, however large the cyst. This method has proved completely successful in the four cases in which he has applied it to otherwise inaccessible cysts, no by-effects being observed and the cyst being evidently harmlessly absorbed in less than a month.

Hospitalstidende, Copenhagen

May 29, 1918, **61,** No. 22

92 *Sweating Sickness in Greenland. H. Kiær.—p. 721. Commenced in No. 21.

June 5, 1918, **61,** No. 23

93 *Renal Glycosuria. E. Jarløv and S. Kraunsøe.—p. 753.
94 Present Status of War Nephritis. O. V. C. E. Petersen.—p. 770. Commenced in No. 22, p. 736.

June 12, 1918, **61,** No. 24

95 *Medical Diseases of the Kidneys. V. Rubow.—p. 785.
96 Pathogenesis of Orthostatic Albuminuria. C. Sonne.—p. 800.

92. **Sweating Sickness in Greenland.**—Kiær describes several epidemics of miliary fever that have occurred in Danish possessions during recent centuries, especially in Greenland. The disease does not seem to spread in the towns as much as in rural districts. The phenomena observed seem to indicate that all affected get the disease from the same source. The M. Erichsen exploring party in 1902 had one member affected with the disease on the long sledge ride from the western coast of Greenland to Cape York, and the polar Eskimos at the latter place then developed the disease, with thirty victims among the 200 members of the tribe. The disease may simulate meningitis or poliomyelitis at first. In treatment, a hemostatic injection of serum and saline infusion seem almost the only reliable measures in treatment, but the physician must be on his guard against the disease himself. The French advocate ferric chlorid. In Greenland the prognosis on the whole was benign, but the epidemics are capricious.

93. **Familial Renal Glycosuria.**—This communication describes in minute detail several cases of high sugar content of the urine with normal sugar content of the blood, all in one family. One young man had probably had the glycosuria for seventeen years; it was casually discovered during an

attack of febrile jaundice after pneumonia in the boy of 4. But he had always been healthy otherwise, except for an intercurrent scarlet fever at 16, and was fond of athletics. The glycosuria did not seem to be modified by restriction of carbohydrates, but when the diet was of an antidiabetic nature, acetone appeared in the urine. This acetone content was still more marked in this young man's cousin, who had been treated for severe diabetes in boyhood and returned ten years later for treatment, as his physician in Hamburg had advised him to return to Denmark as it was impossible for him in Hamburg to obtain the fat he needed in his diet. Closer analysis of the case, however, disclosed none of the characteristics of diabetes to correspond to his high glycosuria, and the metabolic findings over long periods are tabulated and compared with the diet. On a milk diet, at the age of 8, the urine contained 16 up to 44 gm. sugar, a range of from 2.5 to 4.5 per cent. Under three months of hospital treatment, he gained 1,200 gm. in weight but the sugar content of the urine was still 1.8 per cent. when dismissed, and there were traces of acetone. He returned a year later with 5 per cent. sugar, and again this was reduced under treatment, but with the appearance of diacetic acid and acetone, and sugar content of 1.6 per cent. by the end of the month. At 19 the percentage was 3.3, and this was reduced by antidiabetic diet to 0.5, but diacetic acid and acetone then were constant. The blood sugar content was continuously normal, and the patient's general health was constantly good. The glycosuria was only slightly modified by restriction of carbohydrates. Acidosis was never observed when the patient was on an ordinary diet, but it developed under antidiabetic dietary restrictions every time, and disappeared anew as soon as the ordinary diet was resumed. The young man's immediate family showed no tendency to glycosuria, but his cousin was the first case mentioned above, and this young man's brother has 1 per cent. sugar in the urine with normal blood content. The mother and one sister present alimentary glycosuria, but the father, three sisters and a nephew have normal sugar content of the urine. There is no history of actual diabetes or nervous or thyroid disease in the family.

In the two severe cases of glycosuria referred to above, the amount of sugar eliminated in the urine seems to be too considerable to be explained merely by extra permeability of the kidneys, and hence the term "renal glycosuria" is scarcely appropriate, but will have to answer for the present. Similar cases described by others are analyzed in connection with these cases. They all teach that attempts to banish the sugar from the urine by antidiabetic diet are not only unnecessary and futile, but that they are directly harmful, bringing on acidosis, during which the patients feel sick, while they are subjectively in the best of health on an ordinary diet. The cases teach further the folly of regarding every glycosuria as of diabetic origin. When the so-called juvenile glycosuria is seen to persist year after year without progressing and without impairment of the general health, this can scarcely be regarded as a disease, or as contraindicating marriage or life insurance.

95. **Medical Kidney Disease.**—Rubow remarks that the three main groups of medical kidney diseases are those due to epithelial degeneration, to glomerular nephritis, and to sclerosis of the vessels in the kidney. The blood pressure is inclined to go up as soon as the glomeruli become involved. He warns that if the blood pressure naturally is low, as frequently happens in the young, there may be a considerable rise in the arterial pressure while it still is within approximately normal range. In certain cases the high blood pressure is almost the only certain sign of pathologic conditions in the glomeruli, and he queries whether from this alone, along with the following hypertrophy of the heart, we can draw the conclusion as to serious damage of the glomeruli and sclerosis of the vessels. Functional tests of the kidney may prove misleading with negative responses, as the normal range of functioning in human organs is so great. Healthy kidneys are capable of at least three times the work ordinarily imposed on them. This explains the long latent stage with chronic kidney disease, and shows that ordinary functional tests may give apparently normal findings for a long time even with encroaching disease. Only when the test is applied up to the maximal limit of normal functioning, can the findings be depended on to reveal slight degrees of functional deficiency, and therewith the beginning kidney disease. It is difficult and possibly dangerous to apply a maximal test of this kind.

Even the determination of the residual nitrogen in the blood may prove misleading, if the residual nitrogen happens to be anchored in the solid tissues, in the liver, for example and is not circulating in the blood. Some deny the possibility of this, but Monakow's research in 1914 on this historetention of residual nitrogen not only confirmed it but showed that the residual nitrogen in the blood is an unreliable index of the amount retained. He had a patient with reflex anuria for five days, and the fifth day the blood showed 50 mg. percentage of residual nitrogen in the blood, corresponding to about 3 gm. nitrogen. When the anuria stopped, it was found that there had been retention of 62 gm. nitrogen, in addition, to 7.5 liters water. There must have been 55 gm. of nitrogen retained in the solid tissues; that is, the tissues were able to retain eighteen times as much as the blood. Determination of the residual nitrogen has proved useful in many ways, but it cannot be counted on to reveal incipient disease of the glomeruli. It is possible that applying the test in connection with maximal overburdening of kidney functioning may prove instructive. For example, one man of 53 with high blood pressure and hypertrophy of the heart had residual nitrogen in the blood, in the morning, 34 mg. per cent., but twenty-four hours after intake of 20 gm. urea, the figure was 62 mg. per cent.—a figure essentially higher than would be presented by a normal person under the same test. In a second case with apparently the same high pressure and enlarged heart, twenty-four hours after the intake of 20 gm. urea, the blood showed a residual nitrogen content only at the upper limit of normal.

The same conditions are inherent in the determination of chlorids. Only with extreme degrees of renal insufficiency is the chlorid content of the blood very high; the surplus is anchored in the solid tissues. When the glomeruli are unable to eliminate as usual, the consequent retention of urea and salt acts as a stimulant to extra functioning on the part of the glomeruli still capable of functioning, as these substances have a diuretic action. Another means by which the organism seeks to compensate the deficient glomeruli is by sending the blood through the kidneys under greater pressure. The rise in blood pressure and consequent hypertrophy of the heart occur early, and in many cases this alone answers the desired purpose of keeping renal elimination within practically normal range. The high blood pressure and hypertrophy of the heart, in combination with slight albuminuria, are therefore the bases for the diagnosis. Polycythemia may complicate kidney disease, and in the one typical case that has come to necropsy, chronic glomerular nephritis was found. The high blood pressure with kidney disease persists unmodified by repose in bed and dieting. The numerous transitional cases between glomerular nephritis and renal angiosclerosis show that there is no essential difference between them. The cardiovascular form may be regarded as a more or less protracted phase of a compensated stage of kidney sclerosis, while the uremic form is the stage of insufficiency when compensation is failing, or when from the first it has been inadequate. Death may occur from hemorrhage in the brain or from heart failure while the kidney trouble is still in the compensated phase. The findings in the kidney then will be quite different from those with death from uremia.

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97 *Retronasal Tumors. F. Leegaard.—p. 617.
98 *Autointoxication Psychosis. S. Dahlstrøm.—p. 648.
99 *Poisoning from Hexamethylenamin. Y. Ustvedt.—p. 657.
100 *Tubercle Bacilli in the Stools. T. Schram.—p. 661.
101 *Virulence of Diphtheria Bacilli in Convalescents. K. Utheim.—p. 678.

97. **Retronasal Tumors.**—Leegaard reports a case of primary sarcoma in the nasopharynx of a girl under 5. The first symptom was pain; vomiting soon followed and the

eyeballs protruded and were immovable while vision was soon lost and death ensued in less than three months from the first sign of trouble. There was extreme cachexia but no hemorrhage. Necropsy showed an extension of the sarcoma backward into the region of the sella turcica. In another case a boy of 15 presented a tumor in the nasopharynx which proved to be a lymphangiomatous myxofibroma and was successfully removed. There had been no bleeding and the lad seemed otherwise normal, except for a tendency to nocturnal enuresis. The tumor was 6.5 cm. long by 4 cm. wide. Two years later he returned with a recurrence of the fibroma which was likewise removed. This tumor was 10 cm. long by 8 cm. at the widest portion; it was removed through the mouth. It proved impossible to anesthetize the patient by the usual technic as he had evidently become accustomed to get along with the minimum of inhaled air, and it was necessary to give the anesthetic through a tracheal cannula. Leegaard has encountered seventeen cases of juvenile fibromas, and tabulates the details of the fourteen operative cases, including one with recurrences through several years compelling four operations. His experience confirms the general assumption that these fibromas start as a rule in the body of the sphenoid bone, especially in the sphenoid-ethmoidal recess—always within the nose area. These and six other cases observed in the Rikshospital were all males, and all were in the fibroma age, that is, between 10 and 20, with one exception, a boy of 6. There does not seem to be anything to suggest a connection between the tumors and the pituitary body. Spontaneous involution is possible, but not to be counted on while the growth of the tumor may injure the adjoining tissues beyond repair. In one of his cases neither the clinical course nor the findings at the operation suggested this, but necropsy showed that the bone had been eroded and that the growth had spread inside the cranial cavity. He cites further Ingals' case in which the tumor had completely subsided so that not a trace could be found of it fifteen years after the first observation at the age of 13; but in the meanwhile the young man had become blind in the eye on that side. The actual cautery and electrolysis might induce hemorrhage, and fatalities are known with them. In any event they had better be reserved for cases approaching the immune period, the twenty-fifth year. Two of Leegaard's patients died and one of Wolfheim's three. Milligan has reported a case of death twenty-four hours after the operation, which he is unable to explain; there was very little bleeding. In other fatal cases the death was ascribed to the combined effect of the chloroform and bleeding. Leegaard queries whether local anesthesia may not prove important progress. Denker's method seems to have obvious advantages for removal of retronasal tumors, but it is wise to loosen up the tumor all around before attacking the tumor tissue itself; when it can be removed whole there is much less danger of hemorrhage, which otherwise hampers the operation. When the last scrap of the tumor is removed, the bleeding may stop at once. Among his fourteen cases four developed otitis after the operation. This suggests the necessity for not leaving the tampon any longer than is strictly necessary; it cannot be dispensed with altogether.

98. **Psychosis from Autointoxication.**—Dahlstrøm reports the case of a young sailor who within two days became unconscious and then delirious, with pulse of 48 to 56. Under a purgative he voided nine liters of stools and the next day three more liters, after which there were no further signs of the psychosis. Winge has reported a similar case in which the pulse was 40 during the psychosis, and it subsided as the enormously overloaded bowels were cleared out.

99. **Toxic Action on Kidneys from Hexamethylenamin.**—Ustvedt had prescribed the drug for a man of 31 with poliomyelitis symptoms for two days: five 1 gm. doses during the night, four similar doses the next day, and three the following night. At noon of this day the urine was dark red with blood but there was no vomiting or headache, although the poliomyelitis pains persisted after the medication as before. The urine showed blood and albumin for five days after this total of 12 gm. hexamethylenamin in the course of thirty-six hours. No effect on the poliomyelitis symptoms was apparent.

100. **Tubercle Bacilli in the Feces.**—Schram tabulates the findings in eighty-five cases, confirming the common occurrence of tubercle bacilli in the stools in advanced, especially febrile pulmonary tuberculosis. Reh's ether method is a simple and reliable method to determine their presence. The scrap of stool is mixed with distilled water and ether is added, in an Esbach tube. After the tube is well shaken and the coarser particles have sunk to the bottom, the ether extract is centrifuged and the sediment is dissolved in a little ether and spread on a slide. Positive findings are seldom encountered in the earlier stages of tuberculosis in adults.

101. **Virulence of Diphtheria Bacilli Found in Convalescents.**—Utheim has found the bacilli pathogenic for guinea-pigs in convalescents and carriers. The bacilli were cultivated from the secretions of the nasopharynx on beef serum, bouillon and Thiel's medium, sugar agar, etc., and the guinea-pigs were injected intradermally with a loop of the serum culture suspended in 1 c.c. salt solution, 0.01 c.c. being used for the injection. In forty-eight hours there is necrosis at the spot in the positive cases, and when this is thrown off an ulceration is left. One or two of the 125 strains were thus injected in each guinea-pig, and positive results were obtained repeatedly in every one of the seventy-nine convalescents up to the sixtieth day of the convalescence, and also in the eleven chronic carriers. The bacilli isolated from two healthy children from an institution where diphtheria had not been known for over a year caused no reaction in the guinea-pigs. Eighteen of the total ninety-two children had diphtheria bacilli in the nasopharyngeal secretions when they were dismissed from the hospital, but no return cases have been known from them during the year since. Utheim cites further the conclusions adopted by various health boards, etc., in respect to carriers. Everything points to the conclusion that the factor of individual susceptibility has to be considered as much as the virulence of the bacilli. With undiminished virulence, the diphtheria bacilli have to meet a susceptible individual before the disease can develop.

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102 *Tracheitis. J. Møller.—p. 905.
103 *A Typhoid Bacilli Carrier. E. Lenstrup.—p. 911.

102. **Tracheitis.**—Møller remarks that most cases of tracheitis are mistakenly diagnosed as "pharyngitis and nervous cough." In all his experience he has never encountered a case of a purely nervous cough; some lesion could always be discovered by looking for it. The tracheitis induces coughing and hawking, mostly mornings, the rest of the day being free from cough, except in the severer cases. The characteristic cough with acute tracheitis comes on at night when the patient gets warm in bed, and it keeps up for a half hour or hour until a small amount of sputum is coughed up. This may return several times during the night and again in the morning. The cough may be spasmodic so that in children it may be difficult to distinguish between tracheitis and whooping cough. In the severer cases, the cough returns periodically as a small amount of sputum accumulates. Hoarseness is another symptom of tracheitis. The accumulation of phlegm on the vocal cords is the cause of the inability of certain singers to sing in the morning, but respiration is not impeded with pure tracheitis. In treatment, the main thing, he declares, is change of climate, the mountains, a sea voyage, but if this is impracticable, medication should aim to promote expectoration or check the irritation in the throat, with inhalation of a fine spray of some solution of ethereal oils, eucalyptus or balsamics. Painting the throat with iodin or mercuric chlorid or silver nitrate is of not the slightest use when the trouble is in the trachea. Warm drinks may be useful, and cautious exercising of the speaking and singing voice may aid in the cure. Often a little exercise in singing may conquer the last traces of the tracheitis.

103. **A Typhoid Carrier.**—A woman contracted walking typhoid in 1894, and has been responsible for cases of typhoid in her vicinity in 1895, 1904, 1913, 1917 and 1918. The agglutination test was positive, but only one of repeated examinations of the stools. Evidently the elimination of the bacilli occurred only at long intervals.